



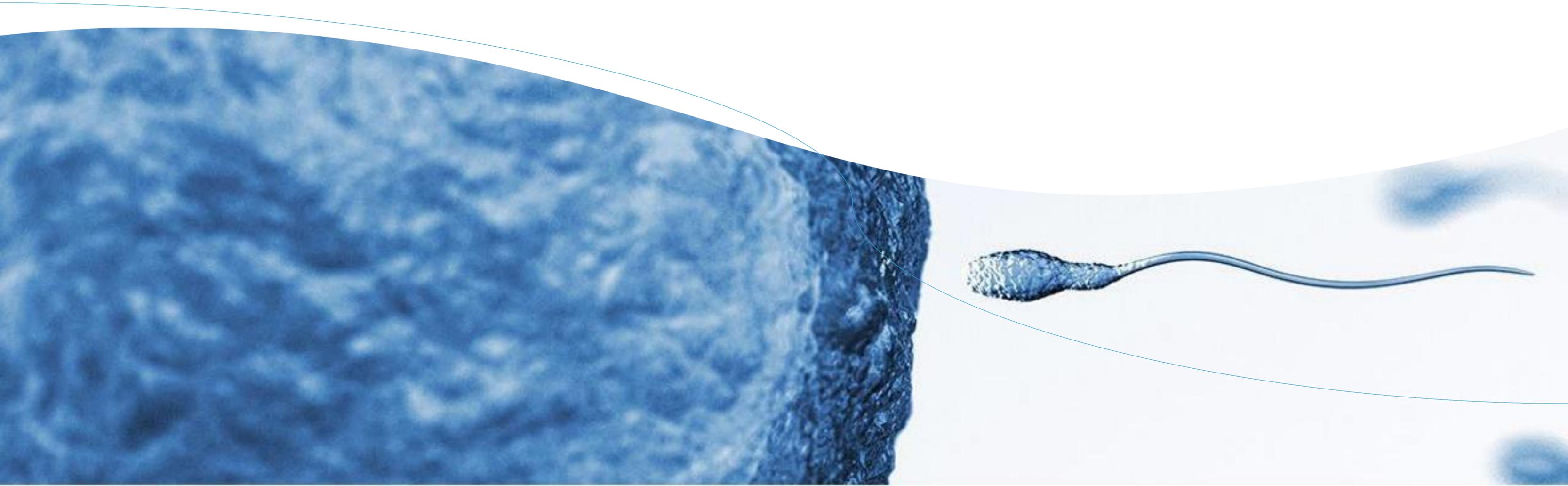
MEMPHASYS

REPRODUCTIVE BIOTECHNOLOGY

(ASX:MEM)

INVESTOR PRESENTATION

MAY 2024





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This presentation provides indicative timelines for various product development and commercialisation activities. These timelines are based on best current estimates, which are subject to change.

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1. WHO IS MEMPHASYS





ALREADY COMMERCIALISED

- 1 A reproductive biotechnology company already selling its first commercial product
- 2 Diverse and innovative pipeline focusing on technology and market product gaps
- 3 Established distribution partners with globally recognised IVF leaders

UNDERPINNED BY STRONG FUNDAMENTALS

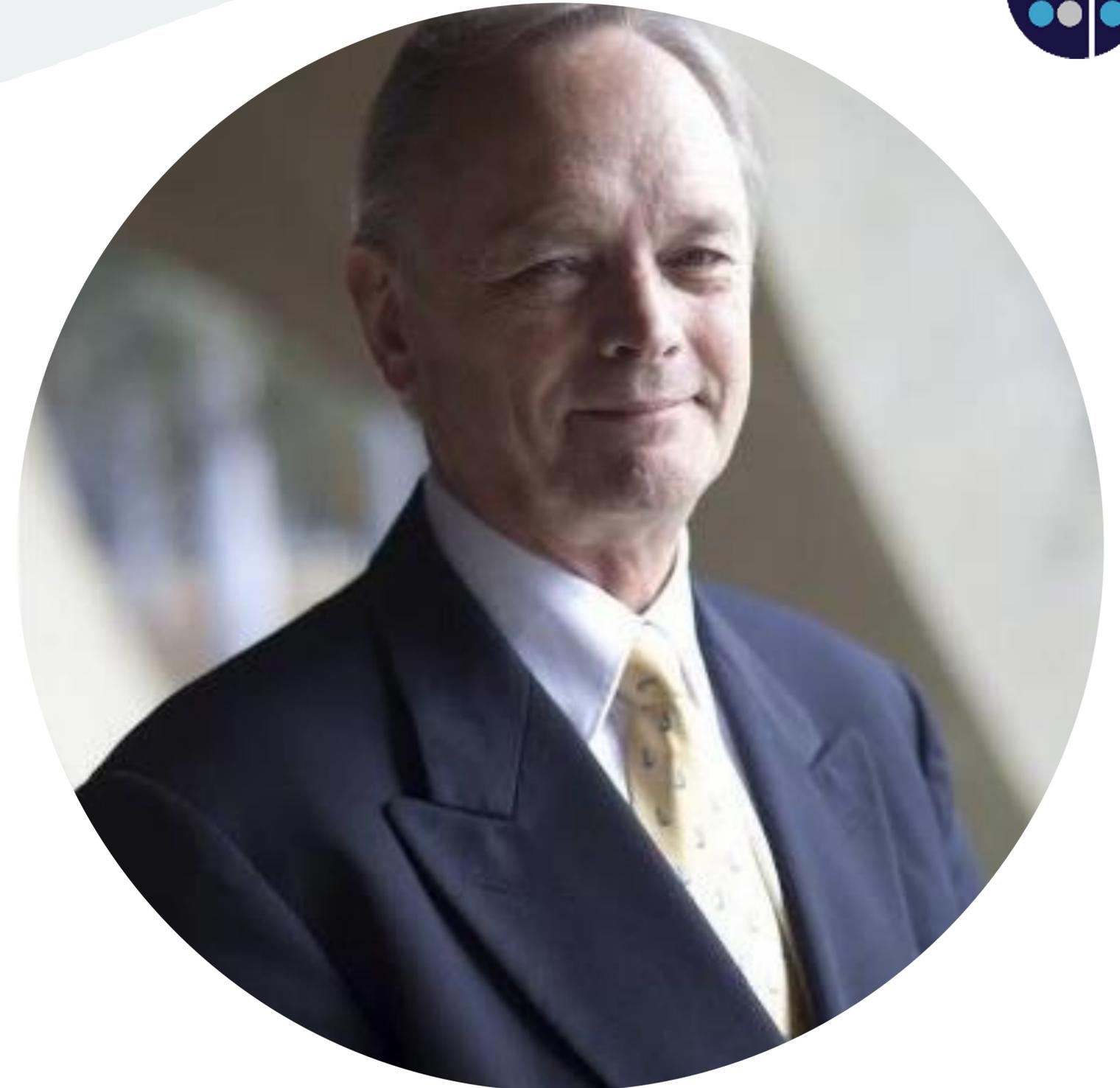
- 1 Highly credentialed innovation team and an experienced board, executing commercialisation strategy
- 2 Exceptionally innovative and disruptive technology with clear pathways to commercialisation
- 3 Strategy is to work with key opinion leaders in early access, high sales potential markets to build sales, brand, user acceptance and networks
- 4 Developing a pipeline of high value premium reproductive products to deliver long-term shareholder value



OUR LEADERS

Distinguished Emeritus Professor John Aitken

- Memphasys Scientific Director
- Global leader in reproductive biology, heading up world-class research team at University of Newcastle.
- Leads development of MEM's pipeline products through R&D, proof-of-concept to commercial strategy stage.
- *Ranked #1 in the world in the cell biology of spermatozoa and germ cells, having published over 650 research articles and work cited >67,000 times**.
- Exceptionally well connected at a **GLOBAL** level to researchers, laboratories and clinics operating throughout the international reproductive industry.



*Source: Expertscape.com

**h-index of 120, highest citation index in his field and in the top 5% for all of Biology and Biochemistry



LEADERSHIP TEAM

Experienced at bringing products to market

Robert Cook <i>Chairman</i>		Dr. David Ali <i>Acting CEO</i>		Paul Wright <i>NE Director</i>		Michael Atkins <i>NE Director</i>		Assoc. Prof Hassan Bakos <i>Director Operations</i>	
<ul style="list-style-type: none">▪ 40 years' experience in healthcare management▪ 7 years as MD & CEO of Healthscope, a leading private hospital, medical centre, and pathology company which was taken over by PE consortium for \$4.4B▪ Completed numerous other healthcare M&A transactions		<ul style="list-style-type: none">▪ 35 years' experience in Animal and Human health across research, discovery, clinical trials, medical affairs, medico-commercial strategy.▪ PhD in Pharmacokinetics▪ Managed BD activities and business units for global companies.▪ Experienced the business end of pharmaceutical product pre-launch and launch strategy and product life cycle management.		<ul style="list-style-type: none">▪ More than 25 years' experience in development and sales of innovative medical devices and diagnostic tools.▪ Specialised in commercialising early research products▪ Served as CEO for three leading companies developing, manufacturing and marketing medical devices and diagnostic instruments▪ 8 years in Business Strategy Consulting with Bain & Co.		<ul style="list-style-type: none">▪ Involved with formation of, and capital raising for, and management of, many listed companies on the ASX, both as a Chairman/Director and as a corporate advisor.▪ Most recently was a Senior Advisor to international stockbroker Canaccord Genuity in Australia.▪ Prior to that spent + 16 years in senior corporate advisory roles with several Australian stockbrokers,, including 10 years as Director – Corporate Finance at Paterson Securities.▪ Currently Chair of Castle Minerals Limited and NED of SRG Global Limited, both ASX listed.		<ul style="list-style-type: none">▪ 17 years' experience delivering research in the assisted reproductive technology (ART) industry▪ 8 years as Scientific Director for Monash IVF (ASX: MVF)▪ 3 years working with Prof John Aitken at the University of Newcastle	



PRODUCT SUITE & PIPELINE

	Felix™ Device Sperm separation device for IVF		RoXsta* Rapid in vitro antioxidant assessment		AI Port Ambient temp. semen transport for animal Artificial Insemination	Media Development Sperm extension, transport and cryopreservation
Market	Early Access	Highly Regulated	Early Access	Highly Regulated	Early Access	Early Access for animal, highly regulated for human
Proof of concept	✓	✓	✓	✓	✓	✓
Prototype development	✓	✓	✓	✓	✓	✓
KOL Testing	✓	✓				
Clinical/field trials	✓	✓			✓	
Sales	✓					

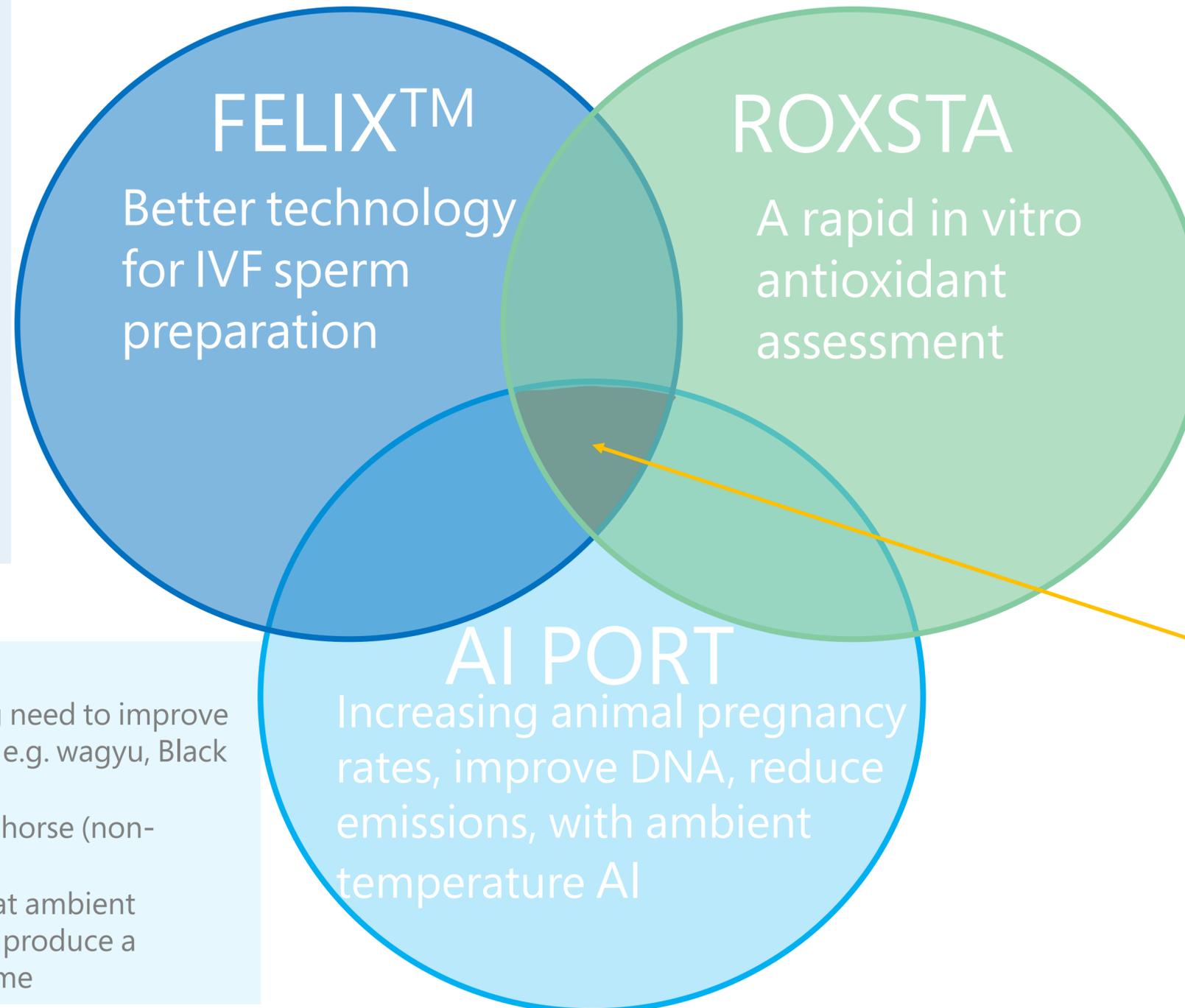
* Formerly named ROSA; trademark application pending



CROSS-OVER IN PRODUCT DEVELOPMENT

FELIX SYSTEM

- Electrophoretic system selects sperm with both low DNA damage & oxidative stress
- Device consists of a console which supplies electricity to a disposable cartridge
- Cartridge contains the novel electrophoretic technology
- Cartridges are single-use with a new one required for each semen sample
- Ongoing, repeat revenue from single-use cartridge



RoXsta

- Point of care diagnostic device
- Six-minute process
- Sensitive & accurate
- Wide sample fluid choice: Semen, blood, urine, saliva, follicular fluid and spent embryo culture medium
- More accurate disease profiling
- Timely clinical intervention

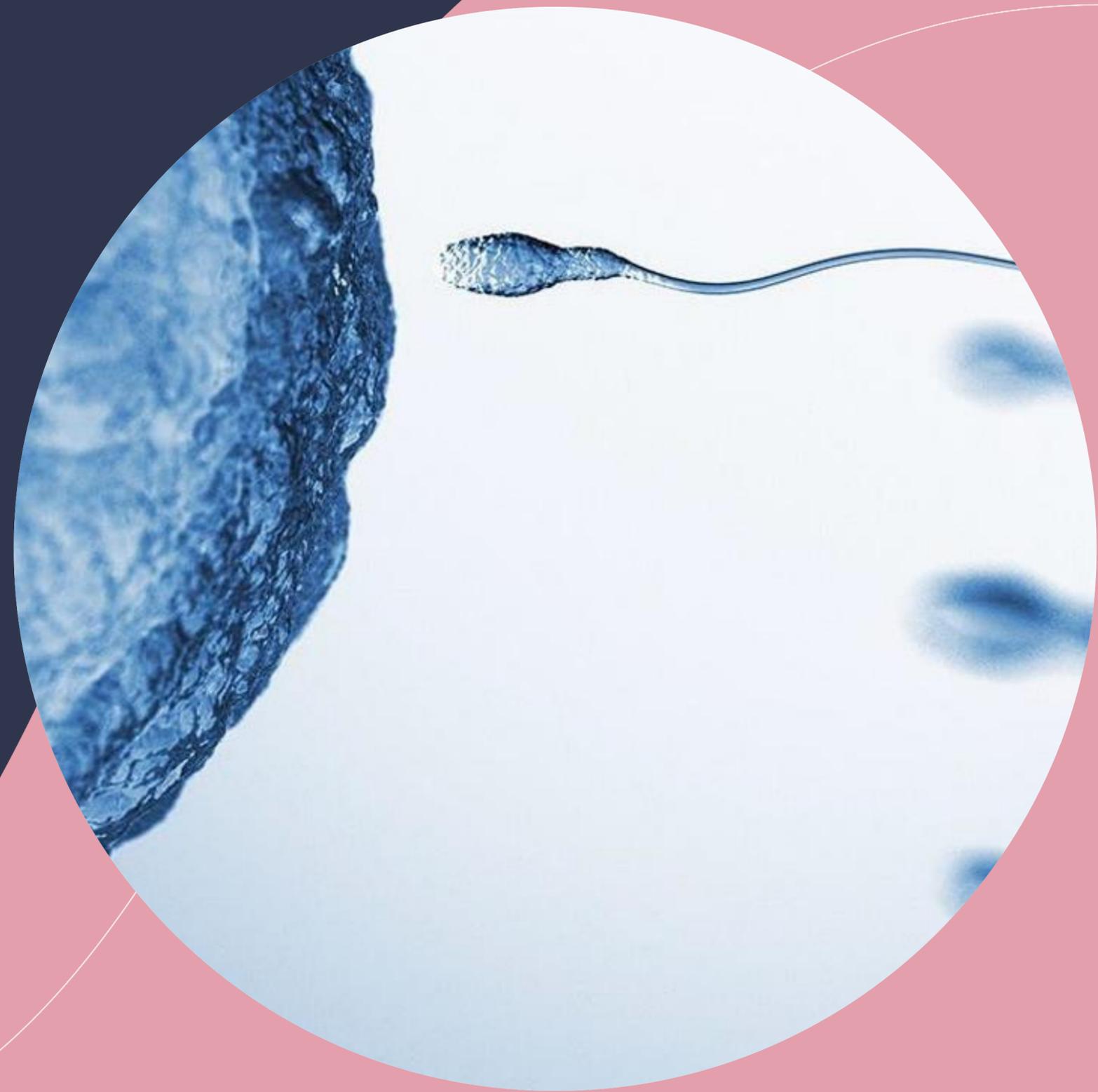
AI PORT

- Initial target: beef cattle - growing need to improve genetics in high end cattle breeds e.g. wagyu, Black Angus
- Later applications: high end dairy, horse (non-thoroughbred), sheep and pigs
- Capacity to collect and transport at ambient temperature (once tested) should produce a better pregnancy / genetic outcome

Cross-over in applications across all 3 products. Development of one product adds value to the other products. In some instances, a suite of products could be offered to industry

2.

**FELIX™ SYSTEM:
BETTER TECHNOLOGY
FOR IVF SPERM
PREPARATION**



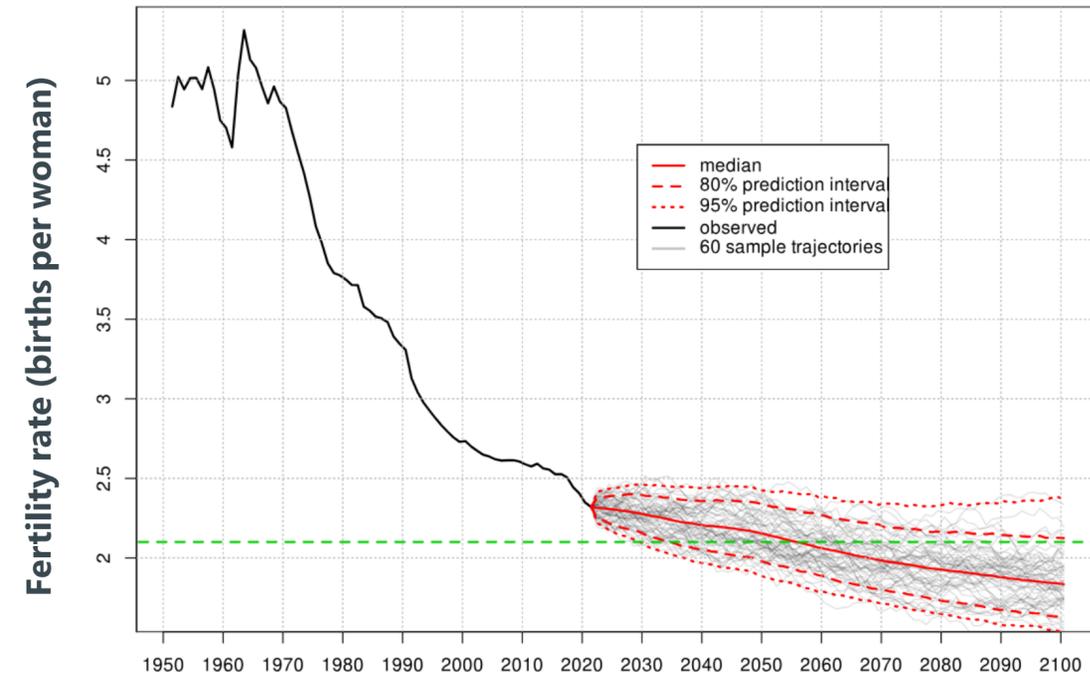
THE ISSUE



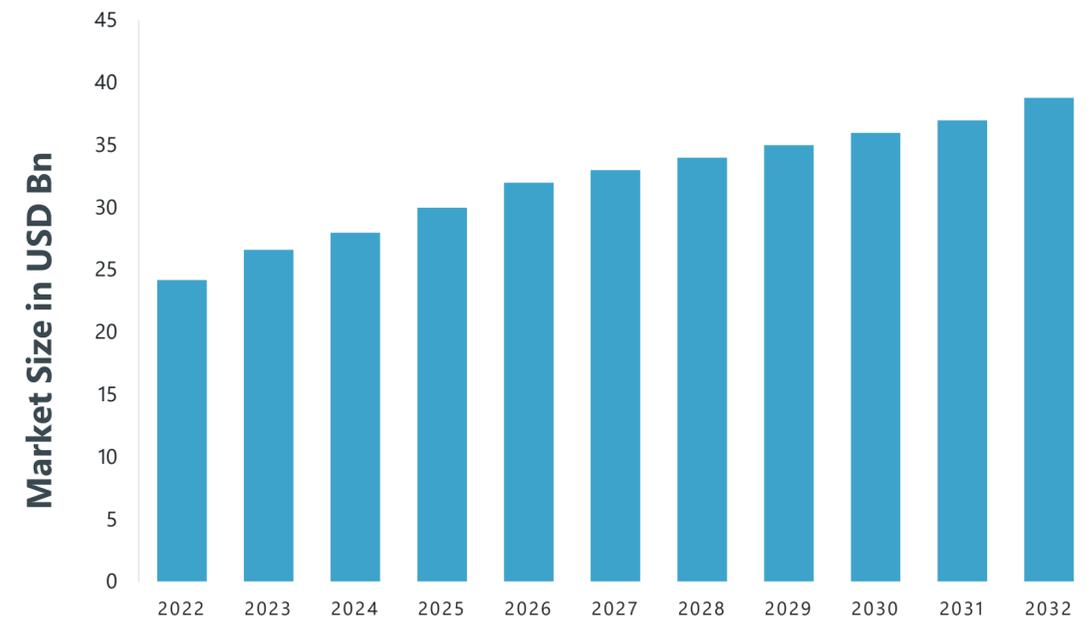
Global fertility decreasing – males account for ~50%

- 1 in 6 couples experience fertility issues
- **Sperm dysfunction is the single most common cause of infertility**
 - Little progress in sperm processing for ART in over 40 years
 - Sperm counts decreasing
 - Sperm DNA Damage and Oxidative Stress are major contributors
 - Solutions to identify or reduce the effect of oxidative stress and DNA damage are desperately needed

Average total fertility rate



Assisted human reproduction market size -globally



FELIX™ SYSTEM:

Better technology for IVF sperm preparation



Electrophoretic system selects sperm with both low DNA damage & oxidative stress

Device consists of a console which applies a controlled charge to a disposable cartridge

Cartridge contains the novel electrophoretic technology

Cartridges are single-use with a new one required for each semen sample

Ongoing, repeat revenue from single-use cartridge



FELIX™ SYSTEM:

Advantages over traditional methods

Conventional DGC (Density Gradient Centrifugation) and/or swim-up processes*

	Process: 30-60+ minutes	→
	Multi-step & labour intensive	→
	Specialised clinical operators	→
	Complex equipment	→
	Operator variability	→
	Limited applications	→
	Potential for sample mix-up	→
	Increased DNA damage (in DGC)	→

VS

Felix™ System

- Rapid - six minutes**
- Single vessel & automated**
- Easy to train and operate**
- Console & cartridge**
- Consistent & operator independent**
- Wider applications**
- Minimised risk**
- Reduced DNA damage**

FELIX™ SYSTEM:

Commercialisation Strategy



Global Opportunity - starts with early access markets

- Initial focus - rollout of commercial sales in early access markets
- Key achievements in early access markets will provide:
 - Clinical Data
 - Legitimise Application
 - Build Brand Profile
 - Build End User Certitude
 - Build a Trusted KOL Network
 - Tested and Proven Pathway
 - All the above will help to establishing sales in advanced markets - Australia, USA, Europe and China
- MEM working with large, trusted partners:
 - Vitrolife in Japan, Canada and New Zealand
 - Monash IVF in Australia

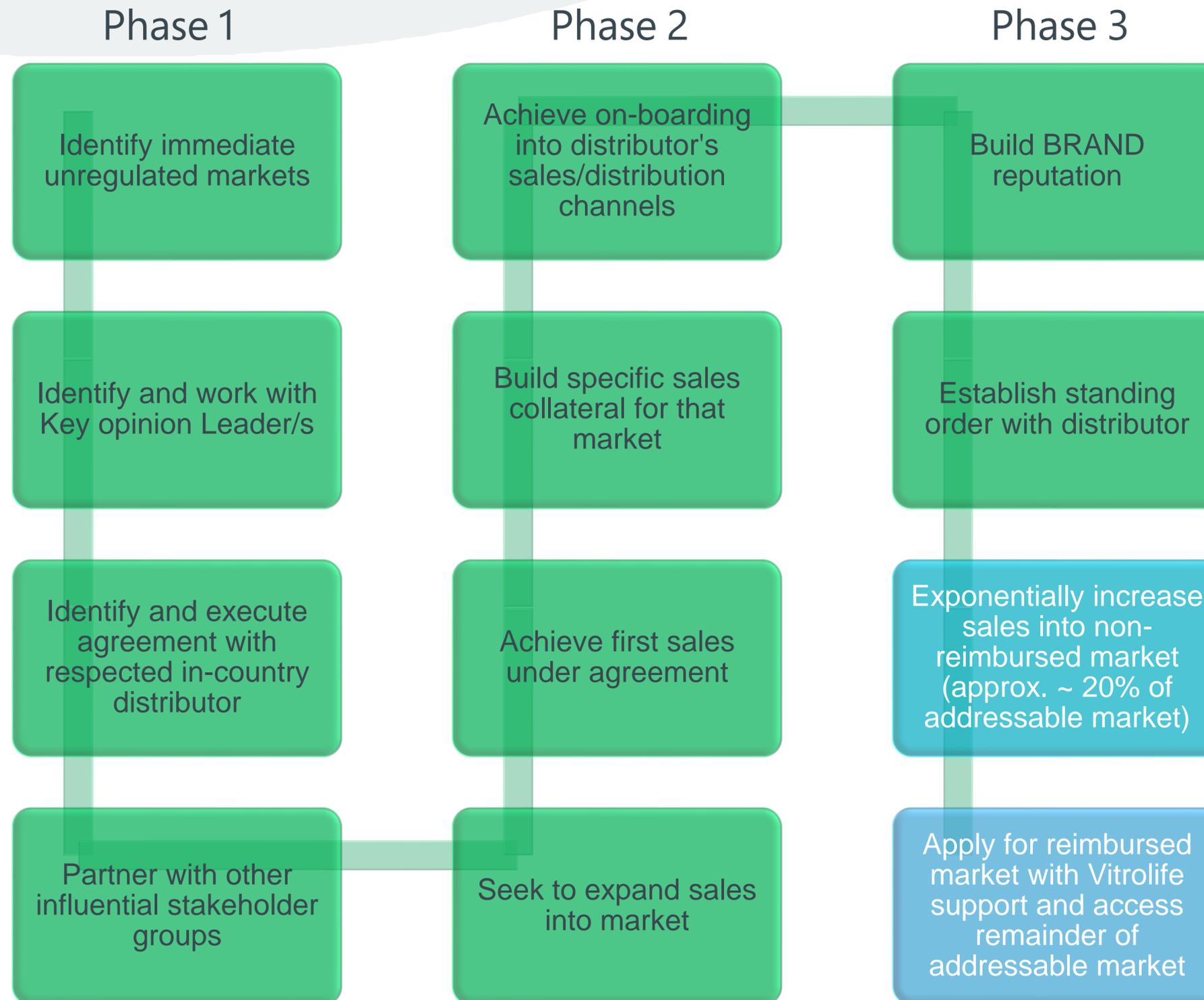
Initial focus is to build sales in four early access markets:

Country	Fresh IVF Cycles in 2018	Expected fresh IVF cycles by 2026	% growth rate	KOL engaged in market	% of global market
Japan	269,110	699,110	+160%	✓	14.5%
India	169,800	489,840	+188%	✓	9.2%
Canada	6,360	21,140	+232%	✓	0.3%
New Zealand	5,300	11,190	+111%	✓	0.3%

Source: Global IVF services Market 2019 - 2026 by Allied Market Research, 2018

FELIX™ SYSTEM:

Commercialisation Model – Japan with strategic partner Vitrolife



FELIX™ SYSTEM:

Japan Early Access Market – expanding into
Canada & New Zealand



*Memphasys Director of Operations Professor Hassan Bakos
with representatives from Vitrolife Japan KK*

Choosing the right partner – Vitrolife Japan KK (subsidiary of the Vitrolife Group)

- Exclusive distribution agreement signed for a 5-year term
- Vitrolife Group is a world-leading global provider of medical devices, consumables and genetic testing services dedicated to the human IVF and reproductive health market
- Group employs 1,100 people across 33 countries and its products and services are available in more than 125 countries
- Has direct commercial engagement with ~90% of all IVF clinics in Japan
- Perfect synergistic partner for Memphasys and Felix™
- Working closely with Memphasys to expand sales in Japan – expanding into Canada and New Zealand
- Sales have commenced and are expanding



FELIX™ SYSTEM:

Japan Early Access Market

Next Steps – Japan

- Japan's national insurance system currently covers IVF, but not the Felix System, which limits sales to approximately 20% of the market.
- Memphis building clinical data sets and working with distributor to position Felix™ for full insurance coverage in future.
- Ensure support from collaborating partner.
- Vitrolife advancing discussions with additional clinics.



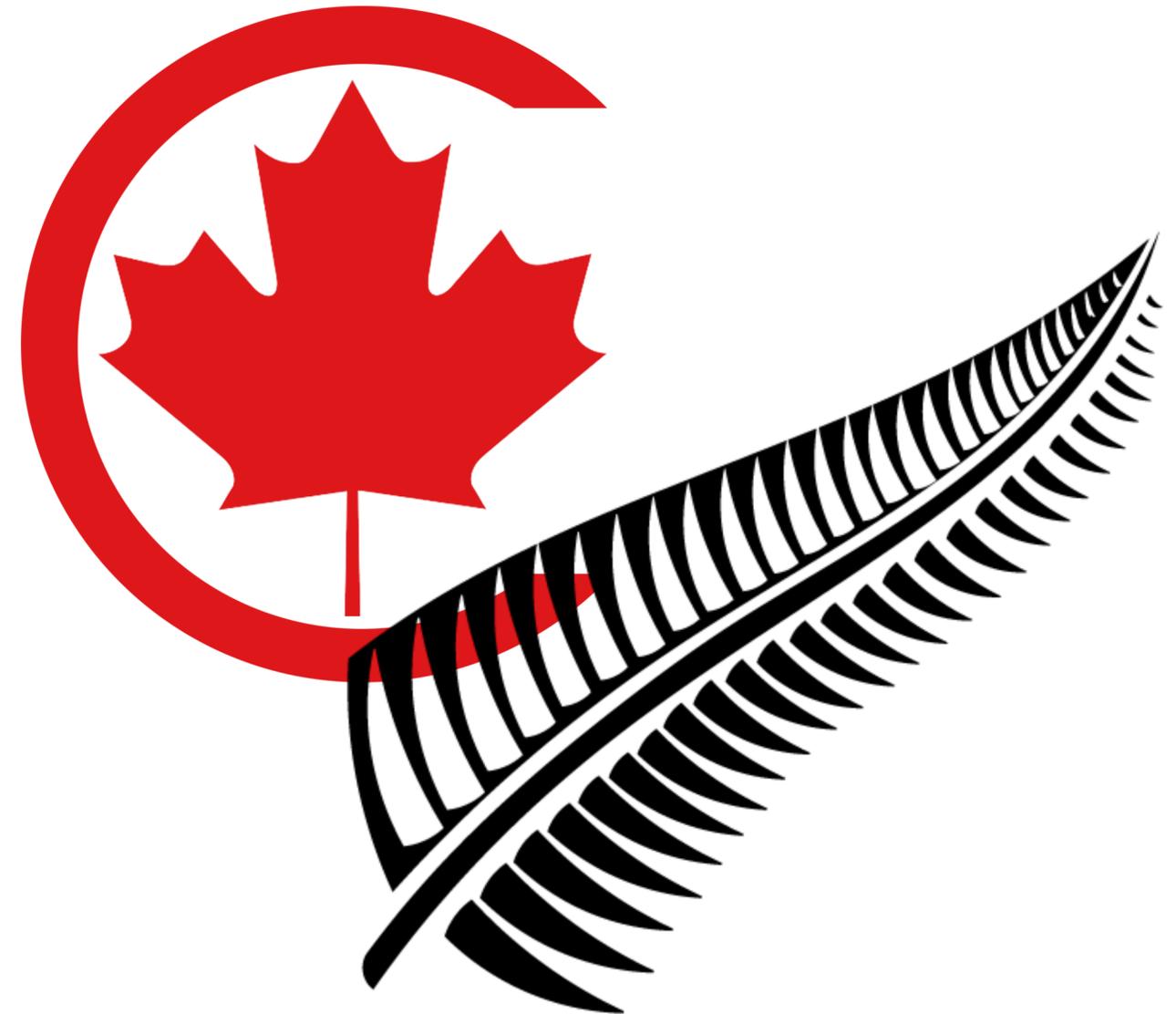


FELIX™ SYSTEM:

Other Early Access Markets

Next Steps – Other Markets

- Eligible for sale in both Canada and New Zealand
- Distribution agreement in place with Vitrolife
- Vitrolife able to deploy **same model as in Japan**
- KOLs in both nations familiar with the Felix System
- Vitrolife advancing preliminary sales discussions with KOLS
- First sales in other markets anticipated in Q3 FY 2024
- Further eligible markets are under evaluation



Vitrolife - Trusted partner currently replicating Japanese model in Canada & New Zealand

FELIX™ SYSTEM:

Major Regulated Markets 2024-2025*



	Regulator	Pre-submission	Clinical Trials	Comments	Recently published data on IVF cycle numbers
Australia	TGA	✓	✓	Anticipated completion of trial 4Q FY24	102,157 (2021) ¹
India	CDSCO	✓	n/a Australian Clinical trial anticipated to be sufficient	In-country (TGA) approval is standard pathway Investigating earlier access options	337,000 (2021) ²
EU	MDR		n/a Australian Clinical trial anticipated to be sufficient	Application pending post Australian trial completion	588,762 (2019) ³
China	NMPA	✓	TBD	Responding to NMPA's technical & clinical Queries. Seeking entry via Hong Kong	1,305,967 (2022) ⁴
USA	FDA	✓	In-Country clinical trial required	Will be a de novo FDA classification	413,776 (2021) ⁵

Swim up: trials completed; DGC: trials 40% completed

*Timetable is constantly being reviewed to expedite timeframe

1. Assisted reproductive technology in Australia and New Zealand 2021 – University of NSW
2. <https://health.economictimes.indiatimes.com/news/industry/indian-fertility-industry-to-witness-huge-growth-in-coming-years/91487508>
3. <https://academic.oup.com/humrep/article/38/12/2321/7320081>
4. <https://www.globaldata.com/store/report/china-assisted-reproductive-technology-procedures-market-analysis/>
5. <https://www.cdc.gov/art/artdata/index.html>



FELIX™ PUBLICATIONS

Memphasys has completed a number of published clinical studies into the use of the Felix™ device in comparison with more traditional sperm separation techniques. Studies include:

Earlier prototype: CS-10

C. Ainsworth, B. Nixon & R.J. Aitken **Development of a novel electrophoretic system for the isolation of human spermatozoa**, *Human Reproduction*, 2005

C. Ainsworth, et al., **First recorded pregnancy and normal birth after ICSI using electrophoretically isolated spermatozoa**, *Human Reproduction*, 2007

S.D. Fleming et al., **Prospective controlled trial of an electrophoretic method of sperm preparation for assisted reproduction: comparison with density gradient centrifugation**, *Human Reproduction*, 2008

C.J. Ainsworth, B. Nixon & R.J. Aitken **The electrophoretic separation of spermatozoa: an analysis of genotype, surface carbohydrate composition and potential for capacitation**, *International Journal of Andrology*, 2011

Current Prototype: Felix™

F. Shapouri et al., **A comparison between the Felix™ electrophoretic system of sperm isolation and conventional density gradient centrifugation: a multicentre analysis** *Journal of Assisted Reproduction & Genetics*, 2023

P. Villeneuve et al., **Spermatozoa isolation with Felix™ outperforms conventional density gradient centrifugation preparation in selecting cells with low DNA damage**, *Andrology*, 2023

A.J. Hungerford, H.W. Bakos & R.J. Aitken **Analysis of sperm separation protocols for isolating cryopreserved human spermatozoa**, *Reproduction & Fertility*, 2023

R. Jayram et al., **First recorded normal live birth after ICSI with electrophoretically isolated spermatozoa using the Felix™ system**, *Proceedings of the annual meeting of Asia Pacific Initiative on Reproduction*, 2023

S. Kitahara et al., **A novel electrophoretic sperm isolation system achieves equivalent ICSI outcomes to the combined density gradient centrifugation and swim-up method in a significantly shorter processing time**, *Proceedings of the annual meeting of the European Society of Human Reproduction & Embryology*, 2024 (Accepted)



FELIX™ PROJECT TIMELINES

	2024			2025				2026			
	Q2 Apr	Q3 Jul	Q4 Oct	Q1 Jan	Q2 Apr	Q3 Jul	Q4 Oct	Q1 Jan	Q2 Apr	Q3 Jul	Q4 Oct
Pre-TGA											
Monash Trial	[Light Blue Bar]										
Japan Felix Trial		[Pink Bar]									
Results Published					[Pink Bar]						
TGA Approval											
TGA Submission				[Light Blue Bar]							
TGA Review					[Pink Bar]			[Pink Bar]			
TGA Approval								[Light Blue Bar]			
India Expansion											
MD-16 requirements (non-manufacturing)	[Pink Bar]										
Explore manufacturing options					[Pink Bar]						
Setting up India manufacturing						[Pink Bar]					
India manufacturing established CP						[Light Blue Bar]					
World-wide expansion											
Begin FDA trial and registration					[Pink Bar]			[Pink Bar]			
Begin EU trial and/or registration					[Pink Bar]			[Pink Bar]			
Expand into Moderate TGA acceptance markets									[Green Bar]		



FELIX™

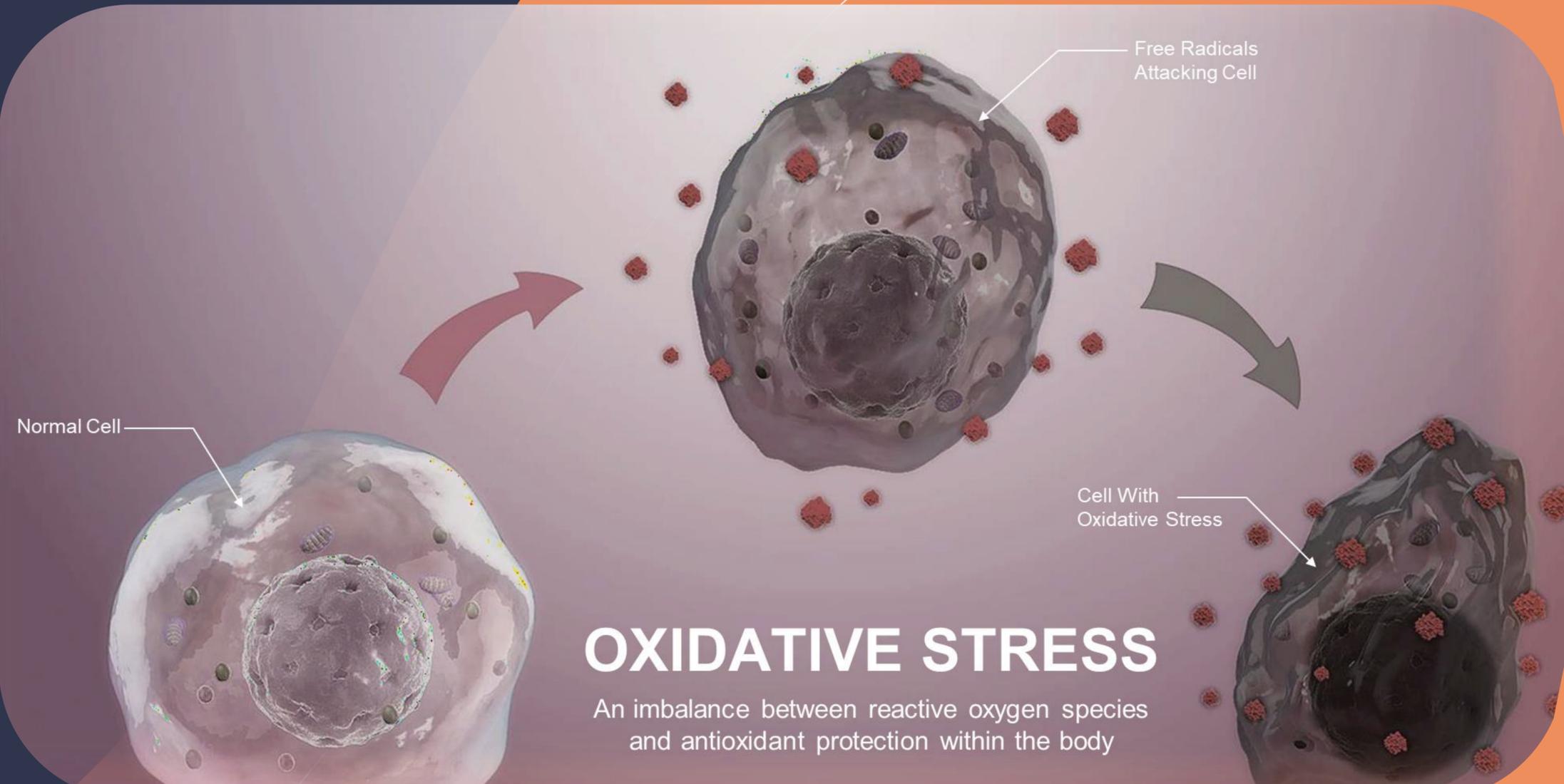
Q&A

3.

RoXsta*

A RAPID IN VITRO ANTIOXIDANT ASSESSMENT

* Formerly titled 'ROSA'

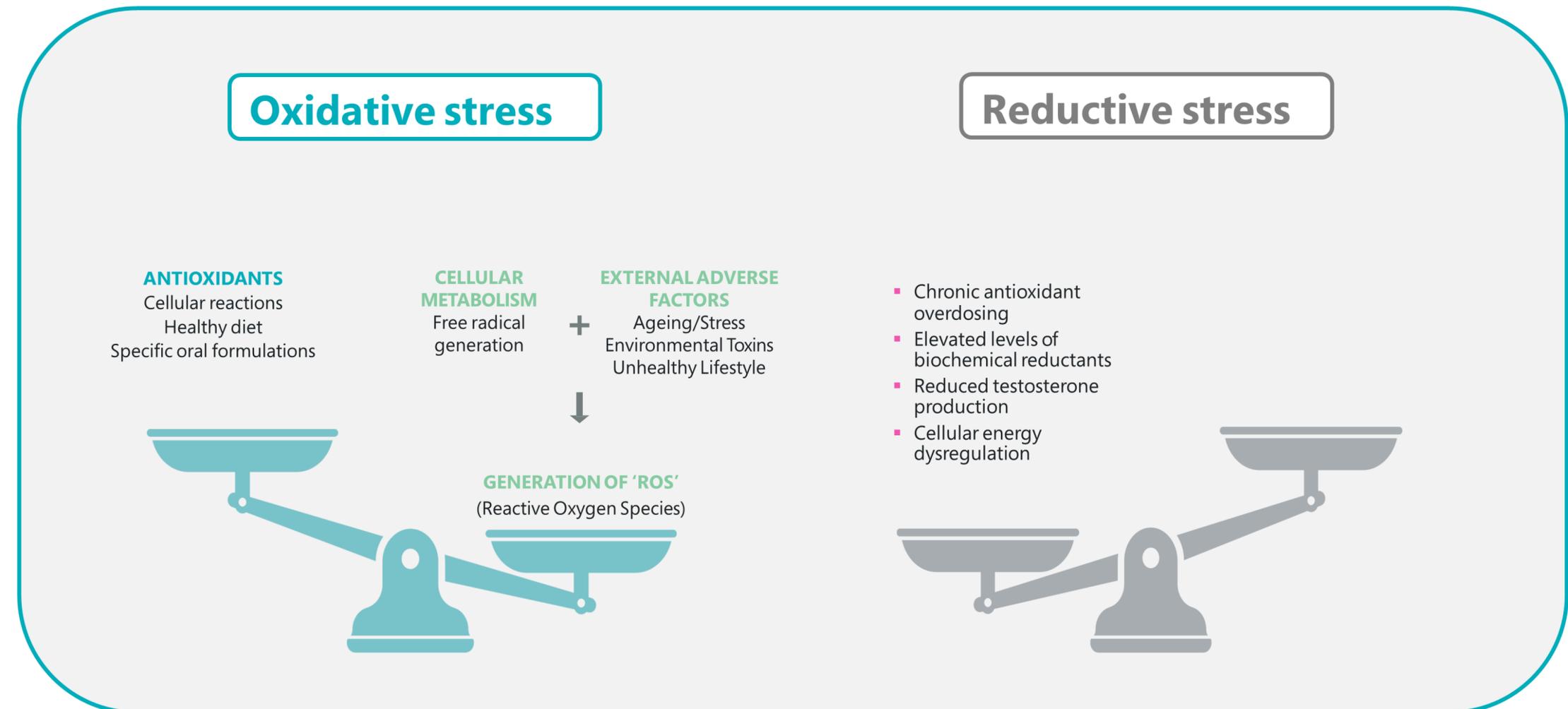




THE ISSUE:

Oxidative & Reductive Stress – Serious chemical imbalances

- Oxidative stress - an imbalance between reactive oxygen species and antioxidant protection within the body and can also severely affect fertility in both humans and animals.
- Reductive stress - an abnormal accumulation of reducing equivalents despite being in the presence of intact oxidation and reduction systems
- Imbalance tends to increase with age and can contribute to serious diseases.



THE ISSUE:

The adverse effect of oxidative / reductive stress imbalance



Oxidative stress



- Aging
- Impaired sperm production and maturation
- Increased sperm DNA damage
- Potential transgenerational effect
- Mutation in offspring
- Miscarriage
- Pre-eclampsia
- Chronic inflammatory disease
- Cancer
- Neurodegenerative disease
- Neuropsychiatric disorder
- Diabetes
- Cardiovascular disorders
- Chronic fatigue
- Asthma
- Erectile dysfunction

Reductive stress



- Heart failure
- Neurogenesis inhibition
- Decreased cellular metabolism
- Muscular dystrophy
- Pulmonary hypertension
- Rheumatoid arthritis
- Alzheimer's disease
- Diminished life expectancy

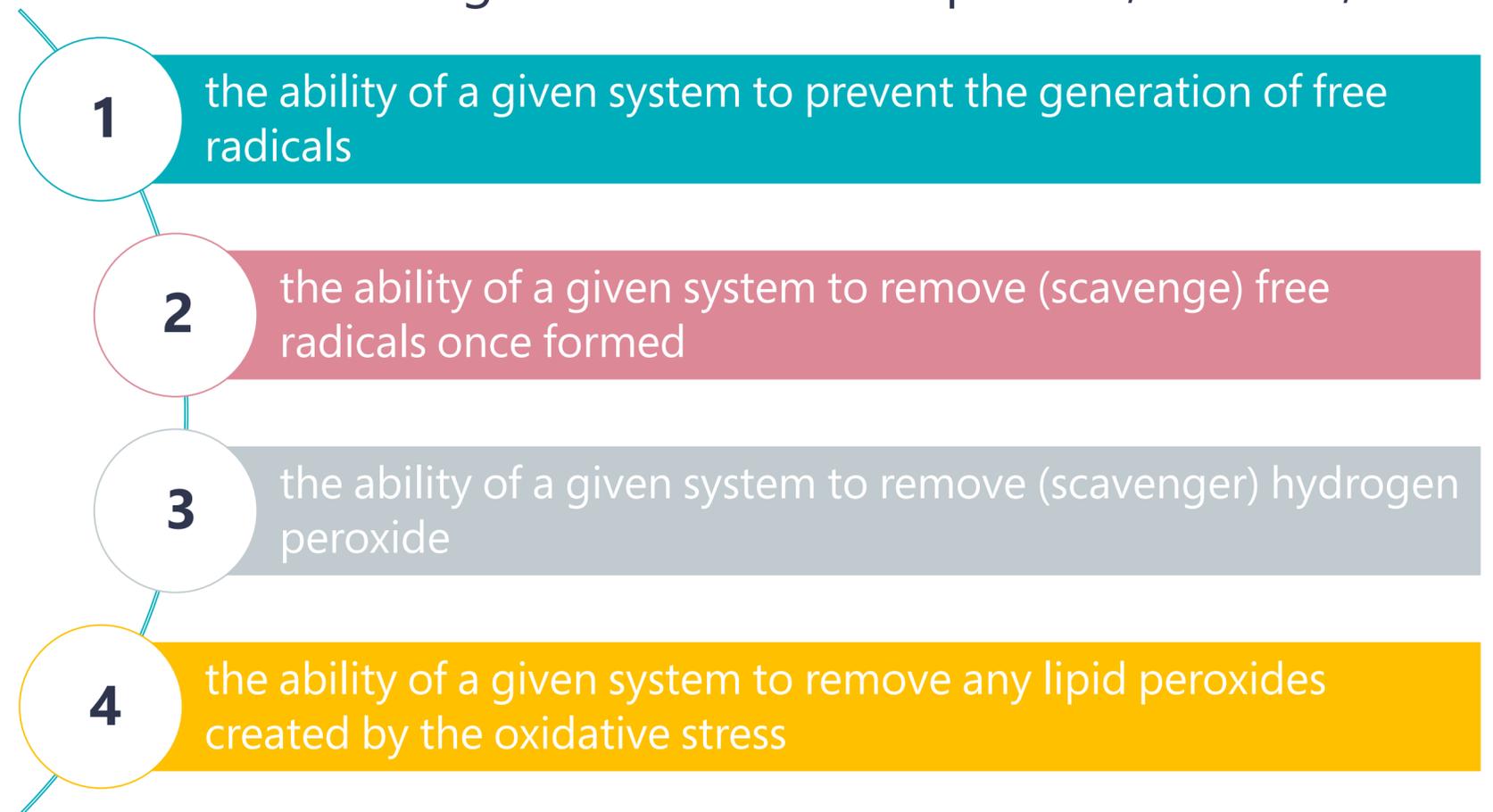


THE SOLUTION - RoXsta:

A unique product offering

- Development of 4 separate point-of-care assays, all using the same fundamental device structure to measure different aspects of antioxidant activity and taking as little as 5min to complete
- Provides a complete picture of the ability of a given system/fluid to defend itself against oxidative attack
- Measuring all 4 aspects of oxidative stress in semen provides correlation with sperm motility, vitality and DNA damage

- The different stages of the oxidative process, in order, are :





UNMET DIAGNOSTIC NEED:

RoXsta technology can address multiple needs and very large global market

Current Practice

Testing for oxidative stress is rare:

- Complex equipment
- Time-consuming in lab
- Oxidative stress often undiagnosed
- Late or no clinical intervention

RoXsta

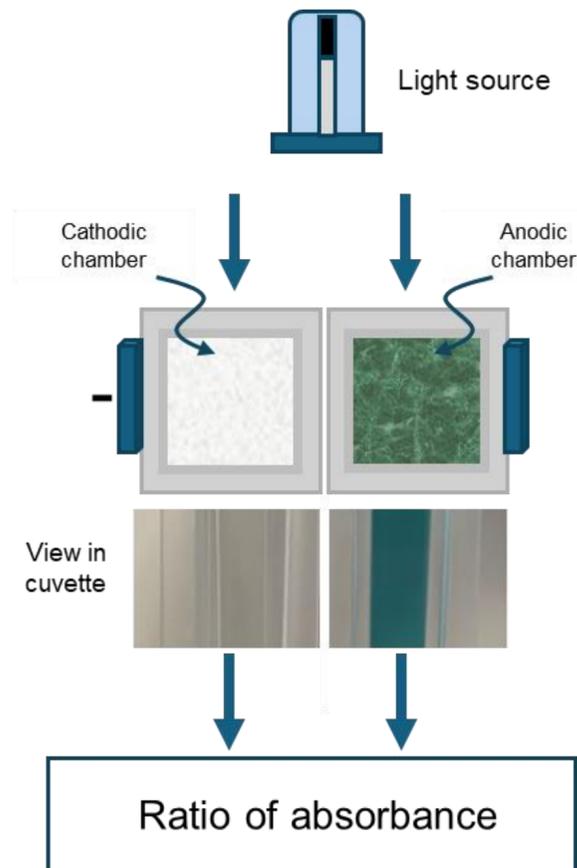
Testing with Memphasys:

- Point of care diagnostic device
- Six-minute process
- Sensitive & accurate
- Wide sample fluid choice:
 - Semen, blood, urine, saliva, follicular fluid and spent embryo culture medium
- More accurate disease profiling
- Timely clinical intervention

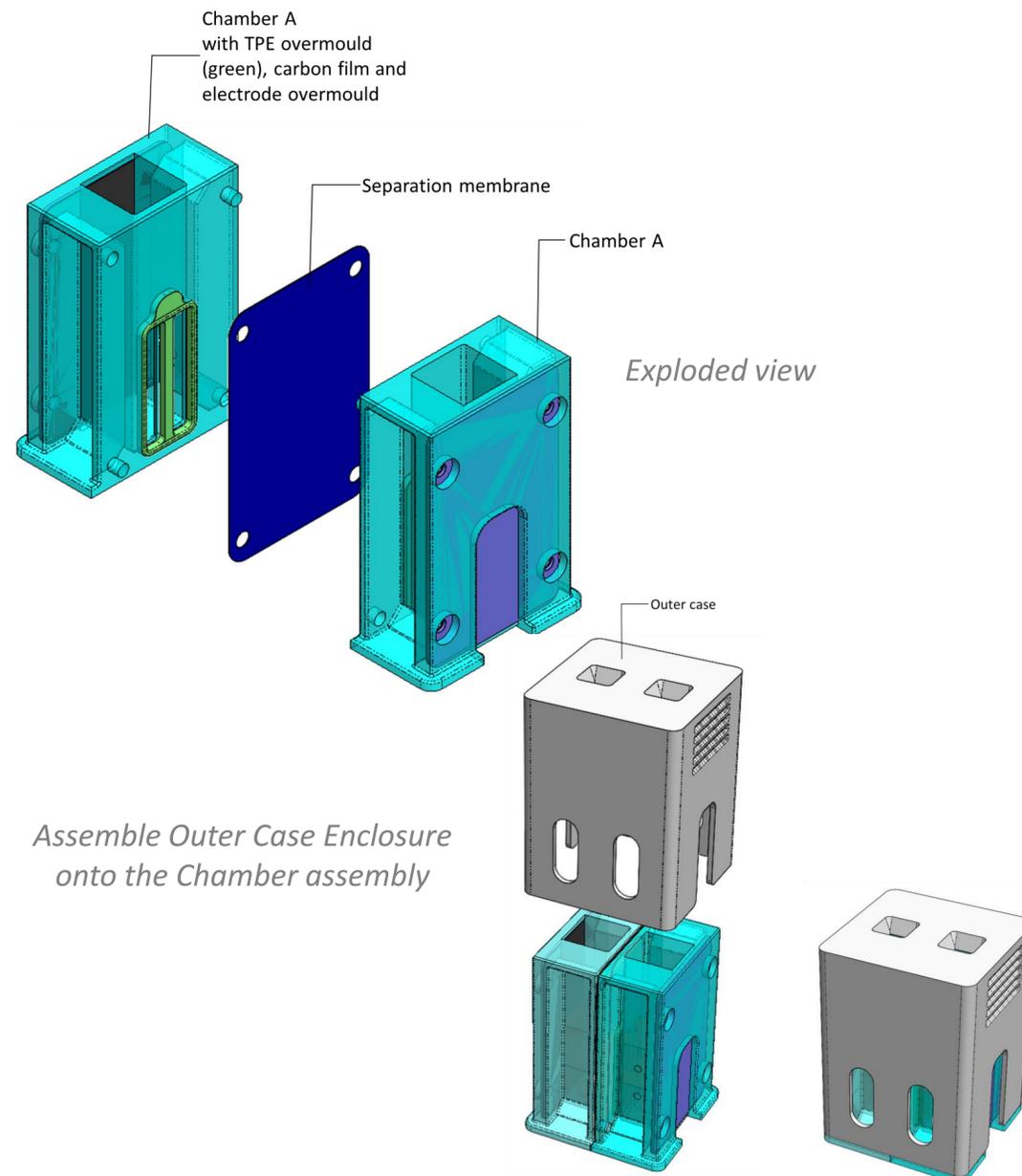
ROXSTA DEVICE SCHEMATIC



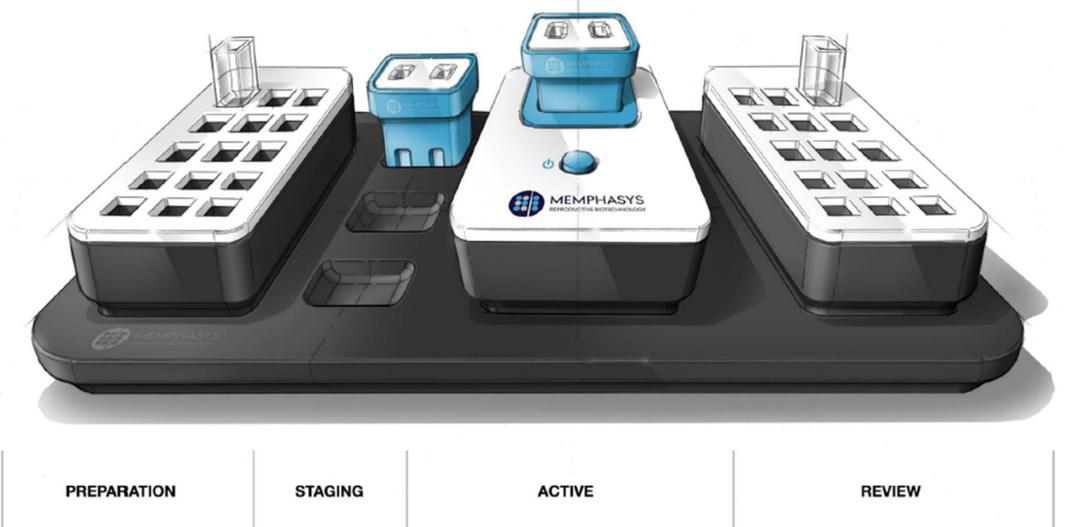
Principle on which RoXsta works



Design concept for the cartridge



Design concept for initial work station – first step before developing fully autonomous system



Cabling, control units and power supply units not shown



COMMERCIAL APPLICATIONS

TARGET MARKET AND OPPORTUNITY

User group	Application	Estimated Market Size
Fertility researchers*	<ul style="list-style-type: none"> Researching underlying etiology of infertility & gestational issues 	\$3b
IVF clinics	<ul style="list-style-type: none"> Screening for infertility issues in male and female patients 	\$3b
Obstetricians	<ul style="list-style-type: none"> Diagnosing and monitoring the progress of pregnancy; detecting foetal distress 	\$4b
Food technology industry*	<ul style="list-style-type: none"> Screening for food antioxidant activity, e.g. to use in product marketing Addition of new, healthy antioxidants to extend food shelf life/improve health benefits 	\$3b
MEM internal use	<ul style="list-style-type: none"> Screening for most powerful antioxidants to develop improved media for human & animal reproduction 	
Other clinician groups	<ul style="list-style-type: none"> Diagnosing and monitoring various health conditions beyond fertility issues e.g. cardiovascular, neurological, endocrine etc. 	TBD
Point of care consumer test	<ul style="list-style-type: none"> Assessing antioxidant status at home 	
Personalised medicine	<ul style="list-style-type: none"> Ability to titrate individualised levels of antioxidants and other drugs to administer 	
Animal Health Industry*	<ul style="list-style-type: none"> Meat quality, IA and domestic pet markets 	TBD
Cosmetic Industry	<ul style="list-style-type: none"> Application of antioxidants for skin and ageing 	TBD

Conservative market size assumptions, based on industry interview estimates



UPDATE ON DEVELOPMENT

- Proof of concept established by Prof. John Aitken's research team at University of Newcastle
- Currently lodging IP, granted in 6-9 months
- Proof of concept publications
- External design house currently developing prototype and manufacturing pilot batch initially for research use.
- KOL engagement and publications to legitimise application.
- Advisory boards with aforementioned business sectors to explore potential landscape and application utility.
- Select high value industries and applications then customise the system to suit



RoXsta:

Pathway to market



Application		Requirements prior to selling			
		Industry KOL testing	Verification & validation studies	Small clinical trial	Regulatory approval
Early sales potential	Fertility research market	✓			
	Food industry monitoring	✓			
	Diagnostic fertility market (male & female)	✓	✓	✓	✓
Higher regulatory requirements	Pregnancy clinical monitoring	✓	✓	✓	✓
	Monitoring for other health conditions e.g., diabetes	✓	✓	✓	✓
	At home monitoring	✓	✓	✓	✓



ROXSTA™ DEVELOPMENT TIMELINE

		2024			2025				2026				2027			
		Q2 Apr	Q3 Jul	Q4 Oct	Q1 Jan	Q2 Apr	Q3 Jul	Q4 Oct	Q1 Jan	Q2 Apr	Q3 Jul	Q4 Oct	Q1 Jan	Q2 Apr	Q3 Jul	Q4 Oct
Phase 1: Test jig & disposable cartridge development	Prototype testing to select best candidate cartridge															
	Production of 1000 cartridges and test jigs for testing															
	Cartridge development completed. Potential sales for research, livestock & food tech applications (low reg. markets)															
Phase 2: Full device development including mini spectro-photometer	De-risking optical test jig & prelim performance testing by John Aitken & KOLs															
	Development completed (pre-regulatory)															
	Potential sales for research, livestock & food tech applications (low reg)															
Phase 3: V&V + pilot + full release of device	Device ready for V&V testing															
	Prelim optics testing by John Aitken															
	Manufacturing															
	Reg approval obtained. Release to market for clinical sales															



ROXSTA

Q&A

4.

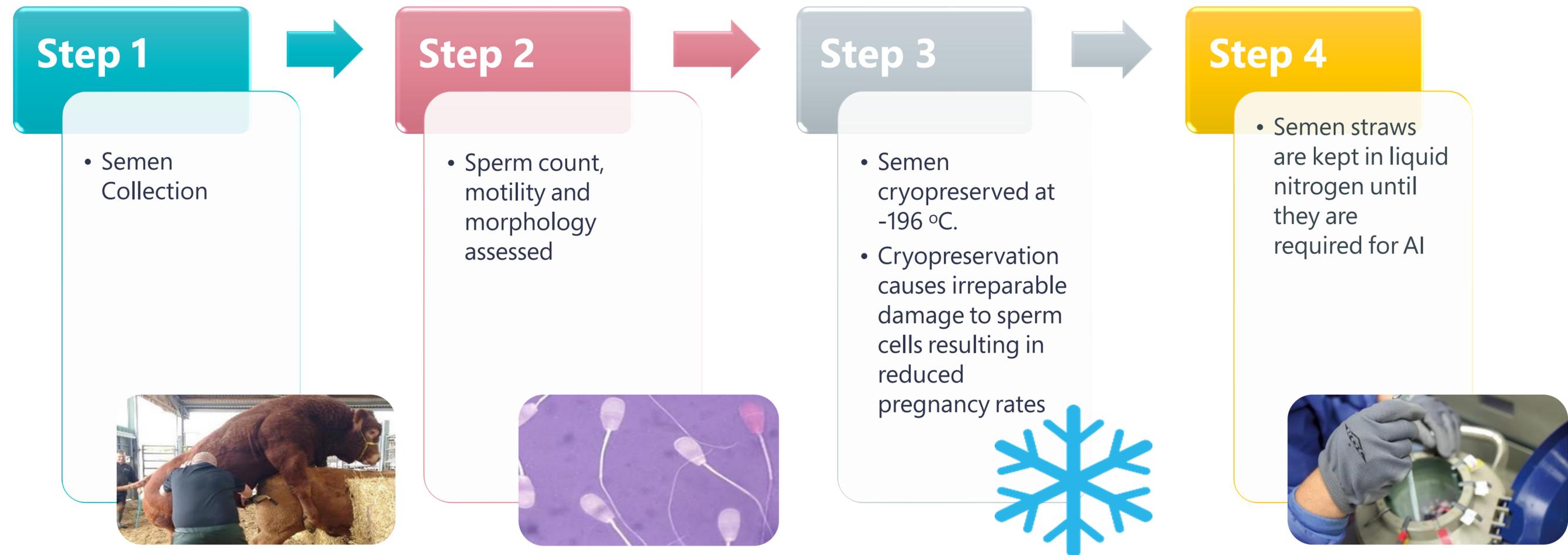
**ANIMAL
APPLICATIONS – AI
PORT**





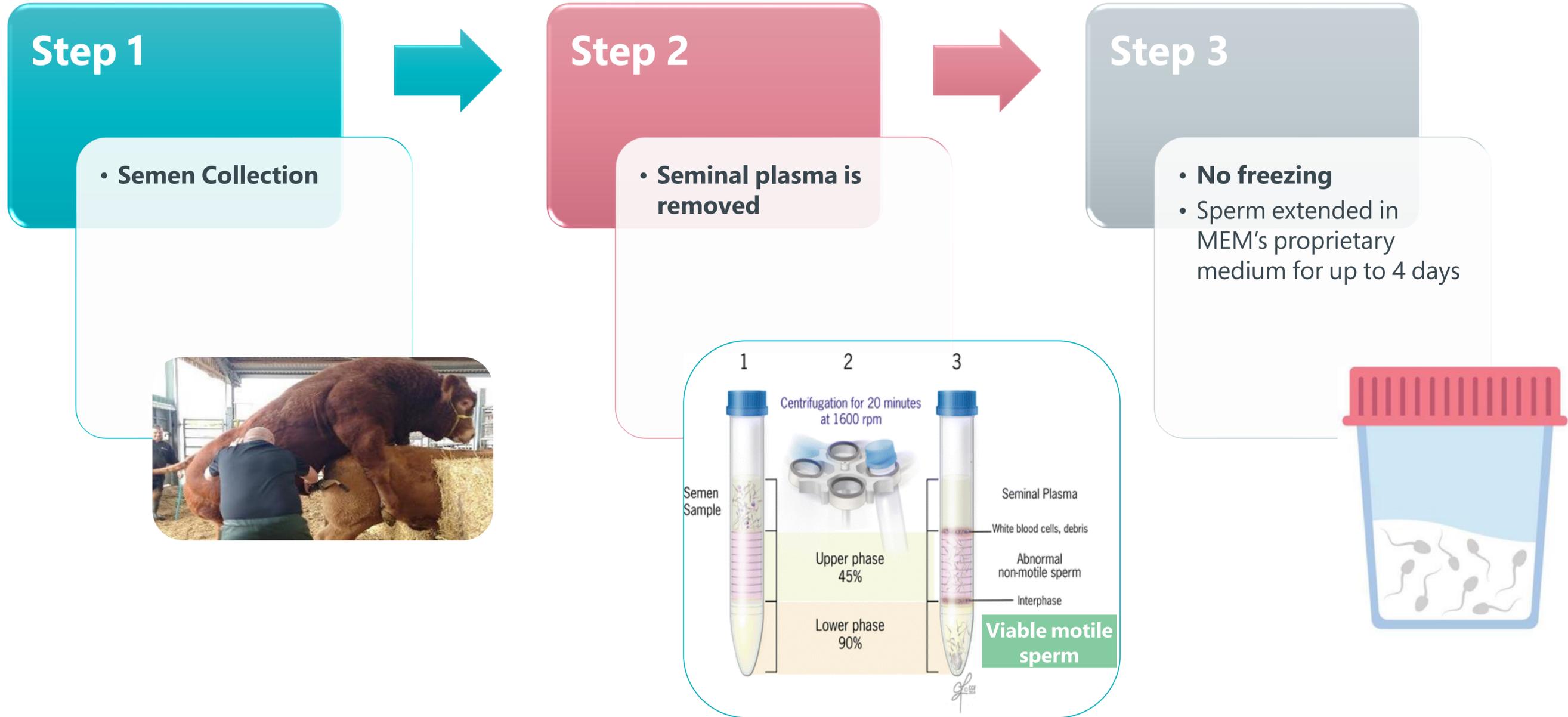
THE ISSUE: AI technology is antiquated and needs improvement

Current Process



AI PORT:

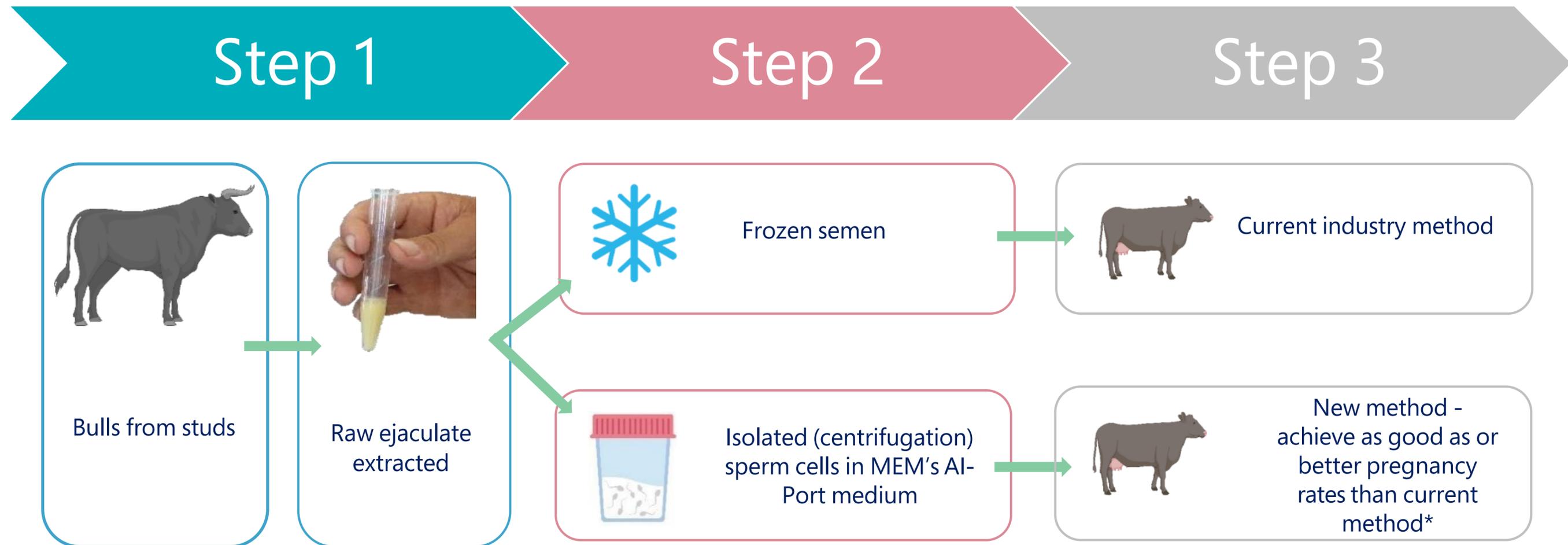
MEM's new protocol to prepare sperm for AI without freezing





SPRING '23 STUDY DESIGN

FIELD TRIAL AIM: Achieve pregnancies that are at least as good as those obtained with traditional sperm cryopreservation and AI*



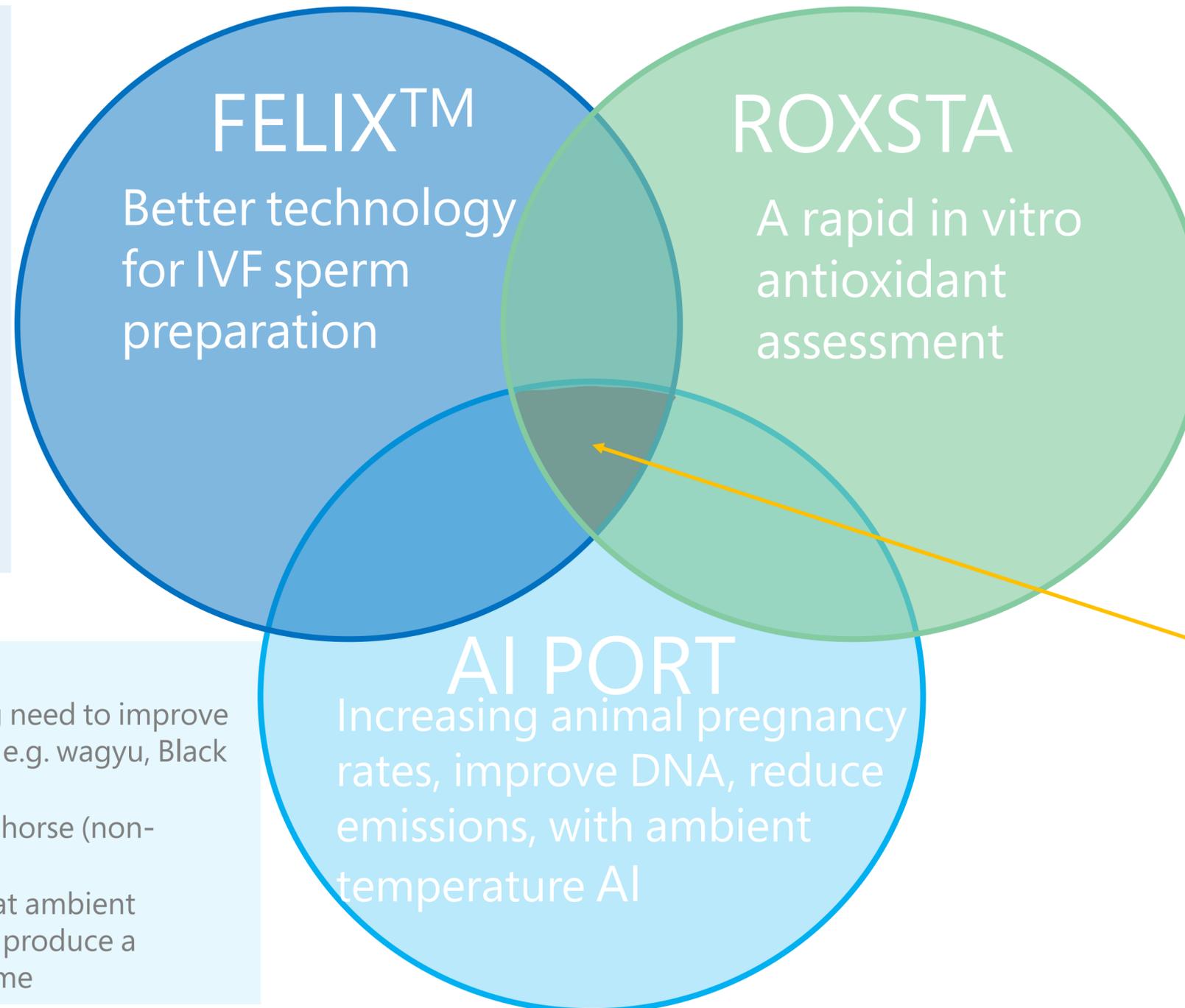
*Even a small improvement, on the industry average rate of 40% pregnancy rate, would provide a substantial economic benefit. Source: Industry interviews



CROSS-OVER IN PRODUCT DEVELOPMENT

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Cross-over in applications across all 3 products. Development of one product adds value to the other products. In some instances, a suite of products could be offered to industry

5.

**CROSS-OVER
DEVELOPMENT
EXAMPLE**

**ANIMAL AI: REDUCING
METHANE (CH₄) EMISSIONS
FROM RUMINANTS
THROUGH COST EFFECTIVE
ELITE DNA MULTIPLICATION**





THE ISSUE:

Methane emissions in livestock

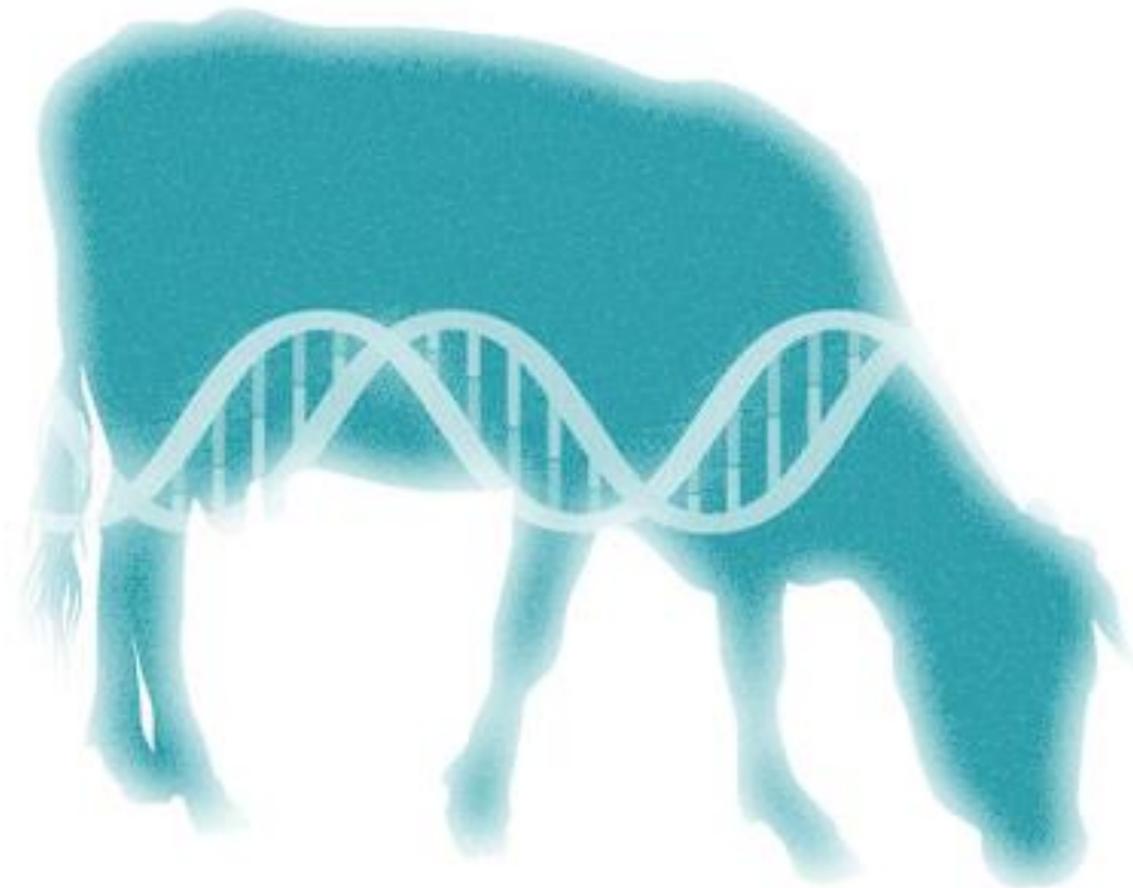
- Agriculture is projected to be the third largest source of emissions globally by 2030
- Methane emissions from livestock are the largest source of greenhouse gas in the agriculture sector¹
- The Australian red meat & livestock industry has set a target to be carbon neutral by 2030 (CN30).
- This means that by 2030, Australian beef, lamb and goat production aim to make no net release of greenhouse gas (GHG) emissions into the atmosphere²
- Industry is proactively taking action with investment in R&D and particular focus on **animal genetics**



1. Australian Government Department of Climate Change, Energy, the Environment & Water
2. Meat & Livestock Australia (MLA)



WHY IS GENETICS SO IMPORTANT?



- Shaping emissions intensity in livestock systems will be heavily influenced by genetics as we move toward 2030.
- Increasing production per unit of emission is costly to identify and will be based on a small subset of elite animals.
- **The small population of elite animals will need to be cost effectively multiplied while minimising DNA breakdown currently caused through conventional artificial breeding practices.**
- Bovine artificial breeding is worth in excess of **US\$2.9 billion** globally¹.

1. Bovine Artificial Insemination Market Size, Share & Trends Analysis Report By Solutions (Equipment & Consumables, Semen, Services), By Sector (Meat, Dairy), By Distribution Channel (Private, Public), By Region, And Segment Forecasts, 2023 - 2030

*Lipid peroxide scavenging, Hydrogen peroxide, scavenging, Free radicle scavenging, Inhibition of free radicle formation



MEM PRODUCTS COULD BE THE “GAME CHANGER”

- MEM is developing a process of extending the viability of sperm cells in an ambient temperature receptacle.
- Fresh semen storage via MEM processes aims to reduce the fragmentation (breakdown) of DNA within a sample.
- The capacity to reduce DNA breakdown that occurs compared to conventional practices will extend the ability to multiply elite genetics.
- MEM aims to use RoXsta in conjunction with animal breeding to further enhance the ability to reduce DNA breakdown and improve elite genetic multiplication in a cost-effective manner





AI PORT / ANIMAL AI Q&A

6.

FINANCIAL SNAPSHOT





MEMPHASYS FINANCIAL SNAPSHOT:

As at 16/05/2024

KEY DATA ¹	A\$
Share price	\$0.008
Shares on issue	1,367.7M
Market capitalisation	\$11M
Cash (31 March 2024)	\$436K

¹ Source: ASX website (as at 16/05/2024)

OWNERSHIP STRUCTURE ¹	%
Peters Investments	19.5
A Goodall	12.7
A Coutts	7.0
Top 20	62.5

CONVERTIBLE NOTES	
Peters Investments	3M (at A\$3M face value & maturity as of 31 Dec 2024)*

MEMPHASYS:

Set for growth



NEW TALENT

- Acting CEO
- Director Business Development
- Appointments underpin critical commercialisation of product and markets

OPENING MARKETS

- Clear pathways to market for each product
- Commitment from Vitrolife
- Growing sales across multiple markets

UNMET NEED

- Product R&D strategy exclusively addressing unmet need in global reproductive technology

PIPELINE BUILDING

- Prof John Aitken (Scientific Director) & University of Newcastle team building a unique, high value product pipeline



MEMPHASYS
REPRODUCTIVE BIOTECHNOLOGY

Thank you

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7.

APPENDIX





ARTIFICIAL INSEMINATION (AI)

The most efficient method to improve herd genetics

- Initial target: beef cattle - growing need to improve genetics in high end cattle breeds e.g. wagyu, Black Angus
- Later applications: high end dairy, horse* (non-thoroughbred)
- Capacity to collect and transport at ambient temperature (once tested) should produce a better pregnancy / genetic outcome
- Being able to do this with reduce number of cells may lead to a great pregnancy yield.

Heritable production traits	Degree of heritability		
	Low	Medium	High
"Mothering" ability	✓		
Fertility	✓		
Birth weight		✓	
Milk production		✓	
Growth rate		✓	
Feed conversion ratio			✓
Marbling			✓
Mature weight			✓
Emissions improvements		✓	



SPRING '23 CATTLE FIELD TRIAL RESULTS

- MEM conducted a field trial at a beef cattle stud in the Hunter region using 144 cows and 4 bulls
- Overall pregnancy rate was low, even with traditional AI (30% compared with industry norm of 50-60%).
- Sperm motilities of 3 out of the 4 bulls were also substantially lower than industry averages, especially for one bull.
- AI-Port achieved a 19% pregnancy rate. Whilst still lagging traditional AI, the rate was a vast improvement over the initial pilot trial of 5%
- Pregnancy rates varied across bulls, with AI-Port slightly outperforming traditional AI on the bull with the highest sperm motility (AI-Port: 8 pregnancies from 24 vs traditional AI: 7 from 24)
- MEM gained valuable insights from this trial and is confident that it can make substantial improvements in the next field trial in 'spring 24, with the aim of matching and possibly beating pregnancy rate of traditional AI.



SPRING '24 TRIAL PREPARATION

Insights gained from the last field trial are being used to prepare for the next trial:

- Provide an on-site lab
 - Will enable centrifuging of semen at point of collection rather than two-hour transport of semen back to Uni Newcastle.
 - Seminal plasma is toxic to sperm and must be removed as soon as possible after collection
- Modify trial protocol by introducing cattle exclusion criteria.
 - Perform health checks on cattle prior to including them in the trial and have sufficient cattle to enable some to be excluded if they do not pass inclusion selection criteria
- Further optimise media prior to trial, including using RoXsta system to select antioxidants that could be added
- Institute additional in vitro and in vivo testing prior to trial eg assess embryo development, acrosome reactions and effect of inhibiting capacitation on sperm vitality and motility in the lab