Actinogen

Strategic Update & Capital Raising Investor Presentation

Dr. Steven Gourlay MBBS PhD MBA: CEO & MD, CMO

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November 25, 2021



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After many years of working in the biopharma industry, I am excited by the huge potential of Actinogen.

Actinogen

In my last major role at Principia Biopharma as Chief Medical Officer, I steered two small molecules from a microcap company valuation, through successful Phase II development and into Phase III, resulting in a significant value appreciation for shareholders when the company was acquired for US\$3.7B.

I find Actinogen to be a similar investment opportunity: excellent science, a promising Phase II molecule for multiple indications, with an attractive valuation, and so accepted the role as CEO / MD and personally invested A\$330K into the company prior to my appointment.

We are now planning for multiple shots on goal and strongly believe the upcoming trials are designed to achieve informative and positive outcomes. I look forward to working with the team to further develop Xanamem as we progress the development pipeline.

> - Dr Steven Gourlay, Actinogen CEO / MD on appointment in March 2021

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Actinogen is a neurotherapeutics developer realising a revolutionary therapy so neurology patients can live their best lives

Capital Raising & Strategic Update

Actinogen announce capital raising of approximately \$15m to fund its programs until the end of 2023.

Highlights associated with the capital raising:

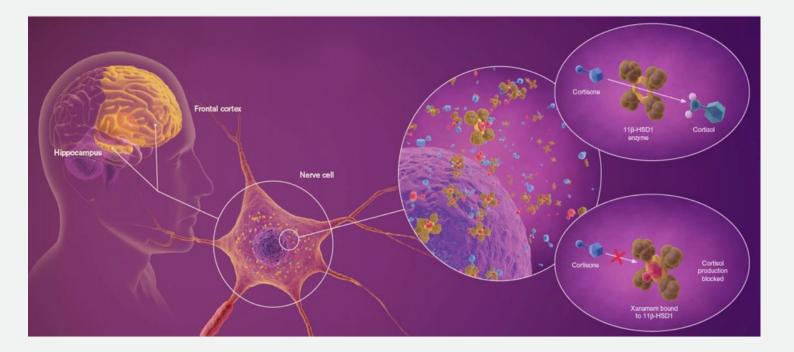
- Actinogen will **pursue Depression associated with cognitive impairment as a third indication,** initiating a Phase 2 study in Australia
- □ Fragile X Syndrome trial is being expanded to sites in North America to accelerate enrollment timelines and involve key, global thought leaders. A dose-ranging 5mg arm is being added to the original design (25 extra patients for a total of 75)
- Retrospective analysis of biomarker data read-out from previous XanADu mild Alzheimer's Disease trial brought forward to H2 CY2022
- Last patients to be enrolled imminently in XanaMIA Part A, results due Q2 CY2022
- Actinogen will now have 3 fully funded Phase 2 trials in 3 CNS indications reading out in 2022/3. Pivotal trials would follow in each successful Phase 2 program





Xanamem: oral treatment and novel mechanism

Brain penetrant 11β-HSD1 small molecule enzyme inhibitor reduces cortisol inside brain cells - modulating signalling pathways and underlying disease processes^{1,2}



^{1.} Xanamem® is a CNS (Central Nervous System) penetrant small molecule based on human PET evidence and CSF measurements

Sooy et al. 2015 showing effects on amyloid plaque reduction in an aged mouse model after 28 days associated with increases in insulin degrading enzyme; Popoli et al. 2011 microglial cell modulation in rats, effects on glutamate, cannabinoid and other signalling pathways

 ® Xanamem is a registered trademark of Actinogen Medical Limited



Actinogen snapshot

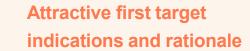
Actinogen Medical (ASX:ACW) is developing a novel oral treatment with rapid onset of clinical activity to address a range of central nervous system (CNS) diseases



Favourable pharmaceutical properties



Substantial clinical data





- Demonstrated target engagement in brain and HPA axis in human trials
- ✓ Low dose, ≤10mg
- Low drug-drug interaction potential
- >250 subjects or patients safely treated
- Large Phase 2 safety database with 12 weeks therapy (N=185)
- Cognitive enhancement activity shown in healthy older volunteers
- ✓ Strong cortisol rationale for treatment of early stages of Alzheimer's Disease
- Strong cortisol rationale for multiple symptom domains of Fragile X Syndrome
- Strong cortisol rationale for treatment of depression and related cognitive impairment
- Molecule in-licensed from U Edinburgh in 2014
- Comprehensive patents in place¹
- Pro-forma cash A\$26.8M² at 30 Sep 2021 plus A\$1.4M R&D Tax Incentive rebate Oct 2021

1. Composition of matter to 2031 plus 5-year extension in most countries, new patents in process

Strong Leadership and Management

Extensive drug development and commercial experience

Experienced Board of Directors...





Dr. Geoff Brooke Chairman MBBS: MBA 💑 cynata 🕐 GBS VENTURE

- 30+ years experience in the healthcare investment industry
- Founder and MD of Medvest Inc and GBS Ventures. Chairman of Cynata Therapeutics, Board Member of Acrux



MBBS; PhD; FRACP; MAICD

••• SymBio AMGEN Cancer Therapeutics CRC

- · 25+ years experience in biotech investment and drug development
- · Board member of Cancer Therapeutics and Symbio



Mr. Malcolm McComas **Non-Executive Director** BEc, LLB; FAICD; SF Fin

pharmaxis FitzroyRiver

- 25+ years experience in the financial services industry
- Chairman of Pharmaxis and Fitzroy River Corporation

...with a talented management team in place



Dr. Steven Gourlay CEO & MD MBBS; FRACP; PhD; MBA

BIOPHARMA Genentech A Member of the Roche Group

- 30+ years experience in development of novel therapeutics
- Former founding CMO at US-based Principia **Biopharma Inc**

See full team and bios at: https://actinogen.com.au/ourcompany/#about-us

Jeff Carter

Chief Financial Officer B. Fin Admin; M. App. Fin; CA



Tamara Miller

Vice President Drug **Development & Strategy**

M.Med Sci; BSc; MSc; PMP: CPPM

Therese Russell

Head of People &





Infrastructure



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Esteemed Advisory Boards

World-leading, premier academics involved in the development of Xanamem

Xanamem Clinical Advisory Board Deeply experienced in Alzheimer's Disease drug development





Prof. Craig Ritchie Chair THE UNIVERSITY of EDINBURGH

- World-leading authority on dementia; senior investigator on 30+ drug trials
- · Chair of the Scottish Dementia Research Consortium: Professor of the Psychiatry of Ageing' Director of the Centre for Dementia Prevention (University of Edinburgh)



Prof. Colin Masters AO

FL®REY E The Royal Melhourne Hospita

- 35+ years research on Alzheimer's Disease and other neurodegenerative diseases
- I aureate Professor of Dementia Research and Head. Neurodegeneration Division at The Florey Institute (UniMelb)

Prof. Jeffrey Cummings



- World-renowned Alzheimer's researcher and leader of clinical trials
- MD, ScD; Founding Director of the Cleveland Clinic Lou Ruvo Center for Brain Health
- Recognised for his work through various awards

Scientific Advisory Board Combining deep understanding of endocrinology, 11β-HSD1 and drug discovery





Prof. Jonathan Seckl Prof. Brian Walker



- Undertaken extensive research in endocrinology
- Senior VP at the university of Edinburgh; Chaired Panels for MRC. Innovate UK and Wellcome Trust
- MBBS UCL, PhD (London)



- 20+ years research in the area of disease
- Extensive experience advising for pharmaceutical R&D
- Pro Vice Chancellor for **Research Strategy &** Resources at Newcastle University, UK



Prof. Scott Webster

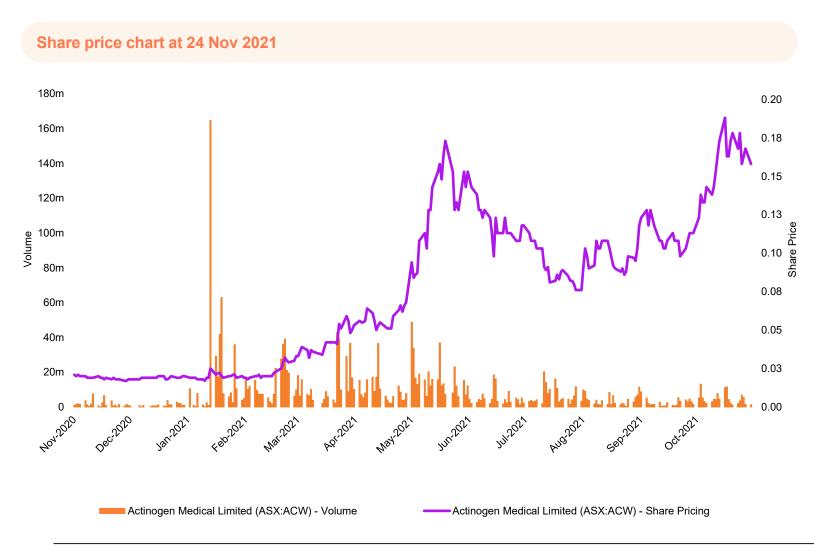


- Chair of Medicines at the Centre of Cardiovascular Science, University of Edinburgh
- Former positions across both biotech and academia
- Founder and Chief Scientific Officer at Kynos Therapeutics

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ACW stock performance 12 months



Trading Information

52 week high	A\$0.20
52 week low	A\$0.02
Number of shares	1,660.6M
Market capitalisation (24 Nov 2021)	A\$268.3M
Pro-forma cash at 30 Sep ^{1,2}	A\$26.8M

Major Shareholders	
BVF Partners	14.9%
Steven Gourlay	3.8%
Edinburgh Technology Fund	2.9%

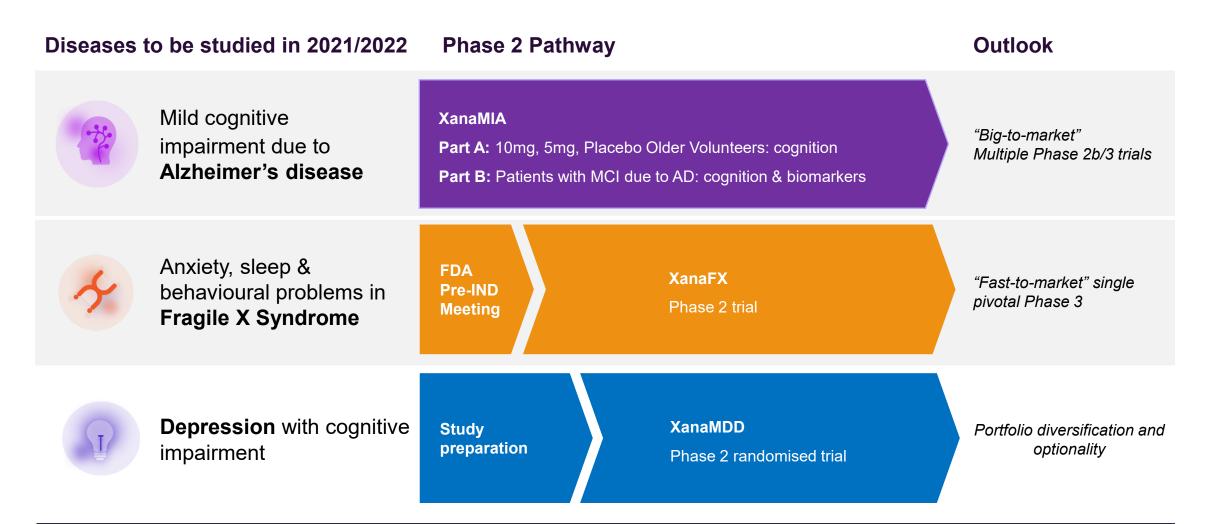


1. Does not include A\$1.4M R&D Tax Incentive rebate received Oct 2021

2. Assumes \$15m capital raising is fully subscribed



Xanamem Clinical Development Pipeline



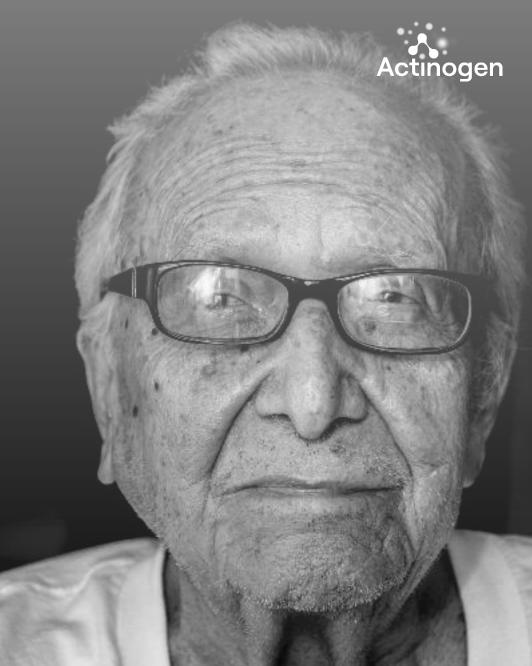


Alzheimer's Disease

Targeting cognitive enhancement and diseasemodification in the early stages of disease

Science Behind the Xanamem AD Program

- \checkmark Cortisol is toxic to monkey brain cells¹
- ✓ Cortisol impairs animal cognition²
- ✓ Cortisol & hippocampal volume/memory³
- ✓ Higher blood cortisol & cognitive decline⁴
- ✓ Higher CSF cortisol & cognitive decline⁵
- ✓ 11 β -HSD1 Alzheimer's mouse model⁶
- ✓ Xanamem & improved human cognition⁷



- 4. Morning cortisol & cognitive decline, Cernansky et al. 2006; Pietrzak et al. 2017
- 5. Longitudinal human study with multivariate modelling, Popp et al. 2015
- 6. 11β -HSD1 inhibition reduced amyloid and cognitive decline, Sooy at al. 2015
- 7. Xanamem placebo-controlled trial working memory & attention (Actinogen data on file)

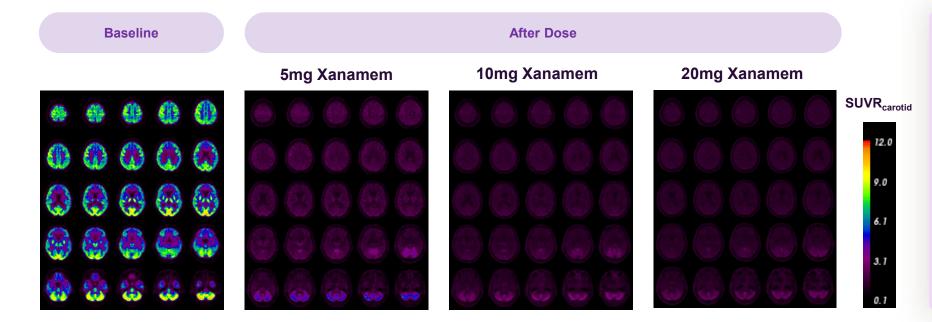
^{1.} Implant in hippocampus, Sapolsky et al. 1990; increased amyloid proteins, Green et al. 2006

^{2.} Literature review, Ouanes et al. 2019

^{3.} Human study with MRI and cognitive assessment, Lupien et al. 1998



PET data supports a low Xanamem dose ≤10mg daily



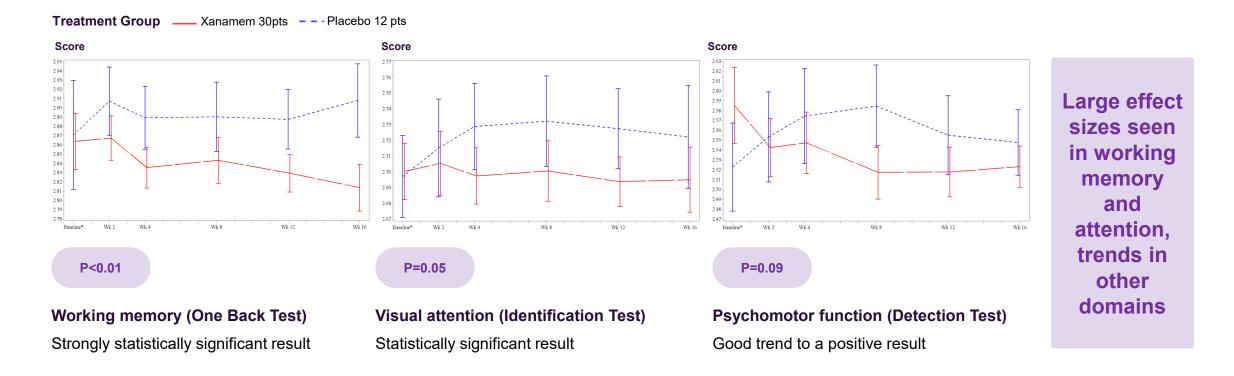
Note: Study population consisted of ~50% healthy subjects (cognitively normal) and ~50% with Alzheimer's disease. Subjects dosed for seven days. Baseline: Mean of baseline scans of patients in that dose group; After dose: Mean of post-dosing (7 days) scans in that dose group. PET data demonstrates that Xanamem extensively binds to the 11β-HSD1 enzyme throughout the brain, with high post-treatment effects (absence of colour) after 7 days at all doses, slightly less at a 5mg dose.

This is consistent with full hormonal pharmacodynamic activity seen with 10mg in clinical trials.



Cognitive improvement demonstrated

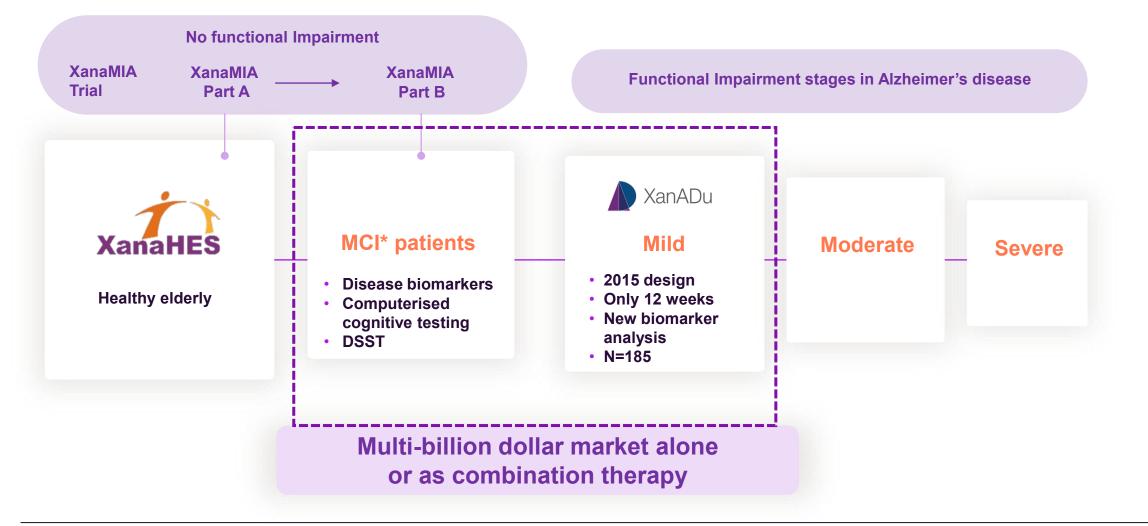
Phase 1 XanaHES study demonstrated statistically significant cognitive efficacy signal in multiple cognition domains based on Cogstate Cognitive Test Battery as early as 2 weeks¹



1. XanaHES Phase 1 clinical trial treated healthy elderly patients with 20mg Xanamem daily (n=30 active, n=12 placebo). All values are the means of observed data. p values were calculated with an ANCOVA (analysis of covariance) model using Baseline values as a covariate.



Bridging Phase 1 cognition data to patients





XanaMIA Phase 1b/2 trial data in 2022 & 2023

Targeting the first stages of Alzheimer's Disease

XanaMIA - Part A

H12022: minimum effective dose on cognition

- **Healthy older subjects** with normal cognition, ≥50 years of age (same as XanaHES trial)
- Sensitive endpoints and testing criteria highly sensitive cognition tests (Cogstate, iDSST)
- DSST used for vortioxetine regulatory cognitive claim
- Dose ranging 5mg, 10mg vs. placebo

2023: disease-modifying potential on biomarkers

XanaMIA - Part B

- Targeting subjects with mild cognitive impairment due to Alzheimer's disease (confirmed using positive serum biomarkers)
- **Cognitive endpoints** highly sensitive cognition tests (Cogstate, iDSST)
- Prospectively measuring disease-modifying potential with change in Alzheimer's Disease biomarkers over 12 weeks treatment
- One or more doses depending on Part A



Planned retrospective analysis of Phase 2 plasma samples for Alzheimer's Disease biomarkers

Bringing disease biomarker data readout forward into 2022

XanADu Phase 2 trial

- □ 185 patients (n=91 active, n=94 placebo)
- □ 10mg daily
- □ Mild Alzheimer's disease without biomarker or imaging confirmation

Preliminary feasibility completed for biomarker analysis extension study

- □ Upwards of 50 patients/guardians sought to be reconsented
- □ Most sites willing to participate
- □ Established relationship with analytical laboratory
- Biomarkers assessed will include Aβ1-40, Aβ1-42, T-tau, Tau 181, NfL, and GFAP



Fragile X syndrome

An inherited disorder caused by the FMR1 mutation on the X chromosome with no approved treatments

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Fragile X Syndrome has high unmet medical need



- Commonest genetic cause of intellectual disability, predominantly males
- Management of FXS is often complex, with **life-long treatment** required for patients
- Xanamem in FXS has been awarded **Rare Paediatric Disease Designation**, and eligible for **Orphan Drug** Designation
- Broadens range of partners in orphan space
- Moderate sized, **comprehensive proof-of-concept** Phase 2
- Anticipate single Phase 3 for approval
- Estimated global market size of ~US\$250M
- Related indications such as Autism Spectrum Disorder
- Priority Review Voucher value ~US\$100-125M

Science Behind the Xanamem FXS Program

- ✓ Elevated blood cortisol in patients¹
- $\checkmark\,$ Elevated cortisol & human symptoms^2
- ✓ Glutamate linked to cortisol response³
- ✓ FMR1 KO mice show raised cortisol⁴
- $\checkmark\,$ Elevated 11β-HSD1 in FXS mouse 5
- ✓ 11β-HSD1 Fragile X mouse model⁶

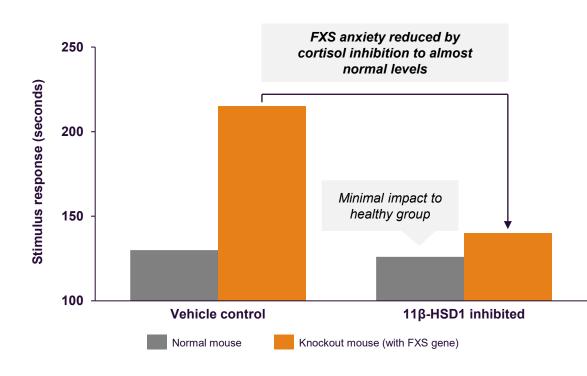


- 1. Hessl et al. 2002; Wisbeck et al. 2000
- 2. Elevated cortisol correlates with symptoms, Hessl et al. 2002; Hardiman & Bratt 2016
- 3. Mouse FMR1 mutation model of Fragile X & glutamate, cortisol mechanism Ghilian et al. 2015
- 4. Mouse cortisol (corticosterone), Lauterborn et al. 2004
- 5. FMR1 deficiency promotes age-dependent alterations in the cortical synaptic proteome, Tang et al., 2015
- 6. Normalisation of anxiety with 11β -HSD1 inhibition, Vanderklish & Francesconi 2019



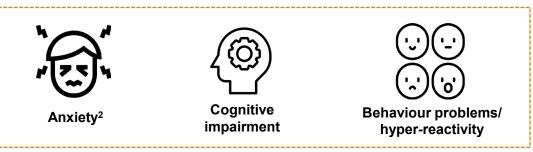
Xanamem may treat multiple symptom domains in FXS

Normalisation of anxiety in the FXS KO mouse¹



Symptoms of Fragile X syndrome are all potentially amenable to Xanamem therapy

XanaFX trial target symptoms



Other FXS symptoms potentially amenable to Xanamem therapy



Sleep

problems

Learning disabilities



Speech and language deficits

 Pre-clinical FMR1 knock-out mouse model using BVT 2733 as the 11β-HSD1 inhibitor showed highly significant results (***p<0.0001). Normal mouse is a wildtype mouse. (Source: Vanderklish PW. 2019. Compounds for treatment of emotional/psychological symptoms in fragile x syndrome, WO 2019/075394 Al.)

2. ~90% of FXS patients suffer symptoms of anxiety





Major Depressive Disorder associated with Cognitive Impairment

Targeting dual cognitive enhancement and antidepressant activity

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Market characteristics of Major Depressive Disorder (MDD)



MDD is common^{1,2}

~5% prevalence globally, 1 in 7 lifetime risk

Neurocognitive symptoms are a typical feature (>80%)³

Difficulty thinking and concentrating, unable to make decisions

Only one anti-depressant has a cognitive benefit claim

Vortioxetine sales US\$500m⁴

- 1. World Health Organization, Depression. 2021.
- 2. Kessler & Bromet 2013
- 3. Conradi et al. 2011, *Psychol Med*, 41(6):1165-74.
- 4. Lundbeck financial reports 2020

Science Behind the Xanamem Depression Program

- ✓ 80-90% report neurocognitive symptoms¹
- ✓ Cognitive symptoms often persist during remission¹
- ✓ Elevated cortisol associated with severe, melancholic depression²
- Cortisol associated with treatment outcomes, relapse, & cognition³
- ✓ Positive effects with GR receptor antagonism with mifepristone⁴
- ✓ Xanamem & improved human cognition⁵



GR, glucocorticoid receptor; Combined analysis of mifepristone for psychotic depression, Block et al. 2018; mifepristone effects on depression in biopolar disorder, Young et al. 2004; Evidence from clinical studies with CRH₁ receptor antagonists, Holsboer & Ising 2008
 Xanamem placebo-controlled trial working memory & attention (Actinogen data on file)

^{1. 3-}year prospective study and review, Conradi et al. 2011

^{2.} Quantitative summary of four decades of research, Stetler & Miller 2011

^{3.} Depression literature review, Malhi & Mann 2018; HPA axis in major depression, Keller et al. 2016

Clinical/Regulatory – established endpoints & regulatory path

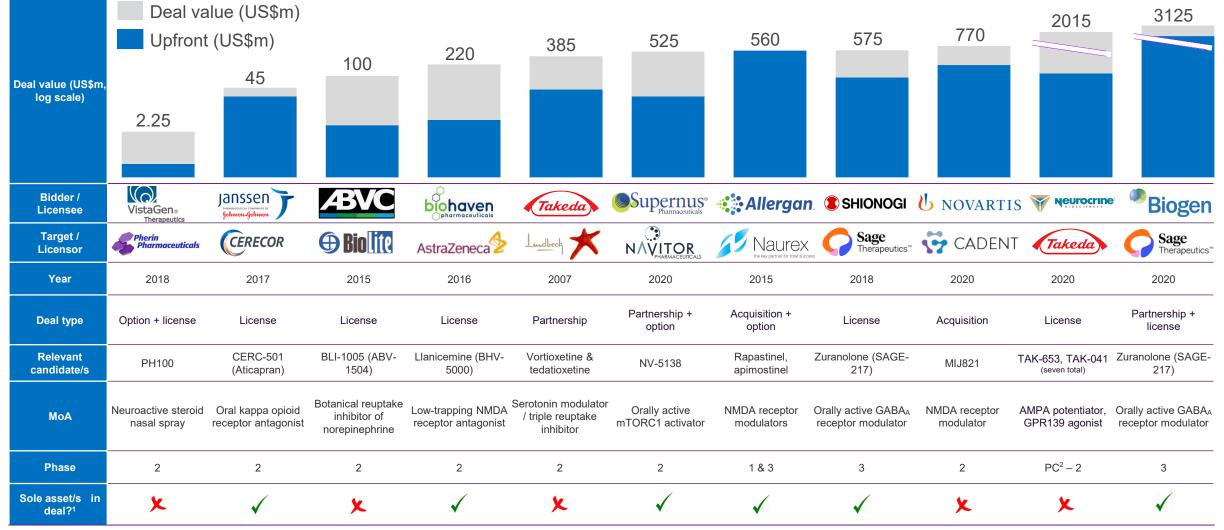


Initial trial will be placebo-controlled Phase 2 of 6-weeks treatment

- MDD endpoints used by other programs
 - Trintellix endpoints: MADRS¹ and HAM-D² scores
 - Spravato (esketamine) endpoints: MADRS score
 - Zulresso endpoints: HAM-D score
- Cognitive endpoints used by other programs
 - Trintellix label claim for cognition largely based on DSST³ score
 - Xanamem XanaHES study showed response in working memory & attention with Cogstate
 - Spravato also included cognition tests as safety endpoints in both short-term and long-term study, as ketamine is known to result in cognitive dysfunction
 - Used Cogstate Battery and HVLT-R⁴

Commercial opportunity is large, even at Phase 2

Global Big Pharma strong M&A interest in acquiring or partnering and licensing assets with novel mechanisms of action where depression is the lead/key indication.



. Indicates whether listed assets were the sole target of the deal, or if additional assets for other indications were also included in deal terms; does not include agreements where an option to license future assets was secured.





Summary and Outlook



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Significant value upside for Actinogen

Accelerate clinical development

- Commence Fragile X Syndrome trial
- Expand pipeline with depression Phase 2 program
- Create optionality for development and partnerships

Forward planning

- Scale up and optimise manufacturing to prepare for commercially viable, large scale production
- Ancillary clinical and nonclinical studies

Value from partnerships, peer companies



Pharma/biotech engagement

• Actively engaging with large and mid-size potential partners



Priority review and PR voucher

- Priority review granted by FDA
- PRVs recently traded for US\$100M-US\$125M



Peer AD company valuations reflect growth potential

 Peer companies in phase 2 or 3 for AD: valuations ~US\$200M-\$2.1B¹

 Vivoryon Therapeutics, phase 2a/b AD lead asset (EURONEXT Amsterdam: 374m euro); Athira Pharma, phase 2 AD lead asset (NASDAQ GS:~US\$537m); Cortexyme, negative topline data in phase 2b/3 AD for lead asset (NASDAQ GS:~US\$365m) and same drug in phase II for periodontal disease and Parkinson's disease; Cassava Sciences, AD lead asset phase 2 asset with positive biomarker and cognition data (NASDAQ GS:~US2.1B); Annovis Bio, very early phase 2 data AD, PD (NASDAQ US\$202m). All companies' value primarily attributed to their lead AD asset. Market capitalisations as of November 23-24 2021.

Next steps and key catalysts

Clinical trials to read out in 2022 and 2023 Alzheimer's Disease

- XanaMIA Part A cognition results Q2 CY2022
- XanADu retrospective biomarker results H2 CY2022
- XanaMIA Part B patient biomarker/cognition data 2023

Fragile X Syndrome

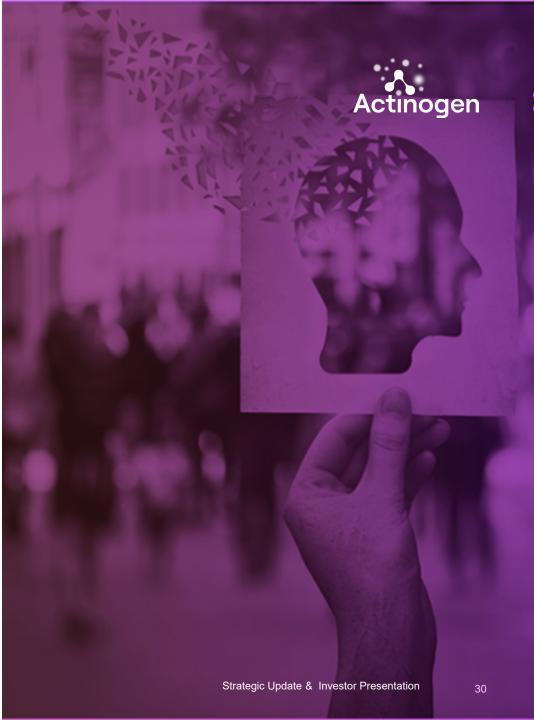
- Commenced in 2021
- XanaFX trial results 2023

Depression

o Commence program immediately, results 2023

Publications and collaborations

- Focus on PET and other peer-review publications
- Leverage academic, grant collaborations



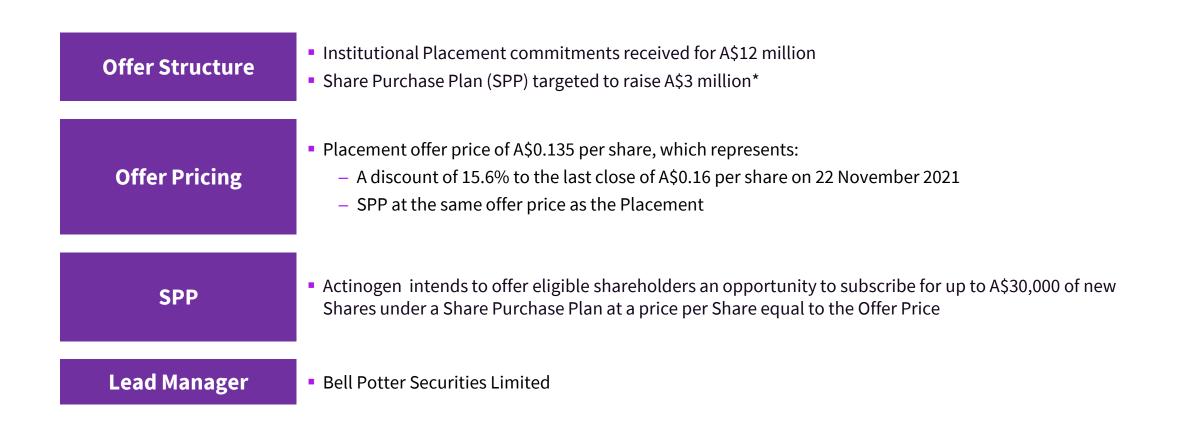






Capital Raising Overview

Actinogen is raising approximately A\$15m via a Placement and Share Purchase Plan



* The company reserves the right to accept oversubscriptions of up to A\$2 million



Use of funds*

The capital raising will fully fund Actinogen's clinical development program through end of 2023

Details	A\$m
Expanded Fragile X program to North America	7.0
Depression associated with cognitive impairment (3rd disease indication)	5.0
Early assessment of Alzheimer's Disease biomarker data	1.0
Additional GMP manufacturing	1.0
Offer costs and working capital	1.0
Total	15.0



Offer timetable

Indicative capital raising timetable ¹	Date
Trading halt	Tuesday, 23 November 2021
Record date for the SPP	Wednesday, 24 November 2021
Announcement of the Equity Raising and trading halt lifted – shares recommence trading on ASX	Thursday, 25 November 2021
Settlement of Placement	Tuesday, 30 November 2021
Allotment and commencement of trading of new shares under the Placement	Wednesday, 1 December 2021
SPP opens	Monday, 29 November 2021
SPP closes	Monday, 13 December 2021
Issue of new shares under SPP	Wednesday, 15 December 2021