



NOVEL DRUG THERAPIES FOR NEURODEGENERATIVE CONDITIONS



NeuroScientific

BIOPHARMACEUTICALS



DISCLAIMER

The purpose of the presentation is to provide an update of the business of NeuroScientific Biopharmaceuticals Ltd ("NeuroScientific", or "the Company"). These slides have been prepared as a presentation aid only and the information they contain may require further explanation and/or clarification. Further information is available upon request.

The views expressed in this presentation contain information derived from publicly available sources that have not been independently verified. No representation or warranty is made as to the accuracy, completeness or reliability of the information. Any forward looking statements in this presentation have been prepared on the basis of a number of assumptions which may prove incorrect and the current intentions, plans, expectations and beliefs about future events are subject to risks, uncertainties and other factors, many of which are outside NeuroScientific's control. Important factors that could cause actual results to differ materially from assumptions or expectations expressed or implied in this presentation include known and unknown risks. Because actual results could differ materially to assumptions made and NeuroScientific's current intentions, plans, expectations and beliefs about the future, you are urged to view all forward looking statements contained in this presentation with caution.

This presentation should not be relied on as a recommendation or forecast by NeuroScientific. Nothing in this presentation should be construed as either an offer to sell or a solicitation of an offer to buy or sell shares in any jurisdiction.



CORPORATE OVERVIEW

- Completed IPO listing on the ASX on the 27 July 2018
- Lead candidate funded through to completion of Phase I (midlate 2020)
- Lead indication Alzheimer's
 Disease, Secondary indication Optic Neuropathy (Glaucoma, etc)

CAPITAL STRUCTURE

ASX code

ASA COUL

Shares on issue

Price (close 15/11/2019)

12m Low - High

Market cap

Shares escrowed 24-months

McRae Investments Pty Ltd

NSB

78.3M

\$0.225

\$0.13 - \$0.435

\$18M

19.3M

18.8M (24%)



LEADERSHIP TEAM



Brian Leedman, MBA
NON-EXECUTIVE
CHAIRMAN

Co-founder of ResApp Health Ltd (ASX.RAP), Imugene Ltd (ASX:IMU) and Oncosil Ltd (ASX.OSL).

Formerly Director of Alcidion (ASX: ALC) and Chairman of Ausbiotech (WA)



Matt Liddelow, MPharm
MD + CEO

13+ years experience commercialising medical devices and pharmaceuticals for Multi-national companies including AstraZeneca



Anton Uvarov, PhD

EXECUTIVE DIRECTOR

Founding director of Actinogen Medical (ASX:ACW) an advanced Alzheimer's biotechnology company. Former Equities Research team with Citigroup, US. Founder of Renaissance Equities, APAC



Stephen Quantrill
NON-EXECUTIVE
DIRECTOR

20 years' experience in corporate advisory and company directorship, Executive Chairman of McRae Investments



TREATMENT MARKETS WITH UNMET NEED



NEURODEGENERATIVE DISEASES (Alzheimer's, etc)

48M people globally

have dementia

70% of dementias

Alzheimer's disease

US \$818B global

economic burden

US\$5B drug sales pa



OPTIC NEUROPATHIES

(Glaucoma, etc)

5% of population

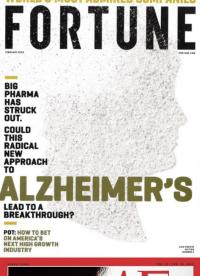
suffer vision loss due to damaged optic nerve

60M people

affected by Glaucoma

US\$3B sales pa







ALZHEIMER'S DISEASE: The need for novel therapeutics

- Drugs targeting the beta-amyloid protein have all failed in late-stage clinical trials...
- Pathology of Alzheimer's disease still not definitive
- Drugs may have been administered too late
- Questions surrounding patient selection for clinical trials, proper animal model
- 20-years of research and BILLIONS of \$ focused on beta-amyloid plaques has not translated to any effective treatment
- Axonal Regeneration and Microglia Induced Neuroinflammation as new strategies

Frequency of
Alzheimer's disease
could be reduced by
50% if the onset
could be delayed by
5-years

LEAD CANDIDATE: EMTINB



NOVEL

- Modeled on Metallothionein (MT-II) a well known neuroprotective and neurogenerative compound, with EmtinB showing superior drug properties
- MOA: Binds LRP-1/2 receptors and a) activates intracellular signaling pathways (activation of ERK, Akt, and CREB) that "turn on" survival promoting processes of neurons; b) reduce cytokine-stimulated activation of microglia



VALIDATED

- Several preclinical in vitro models successfully repeated
- Animal models demonstrated efficacy and unique properties

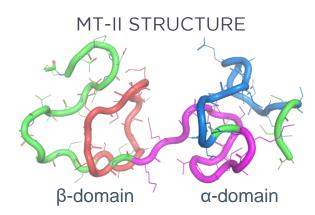


POTENTIAL FOR MULTIPLE INDICATIONS

- Neurodegenerative
- Optic Neuropathies (Glaucoma, etc)







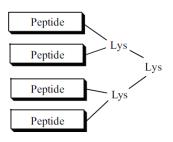
- 61 amino acid length
- Binds divalent metal ions
- Difficult to manufacture





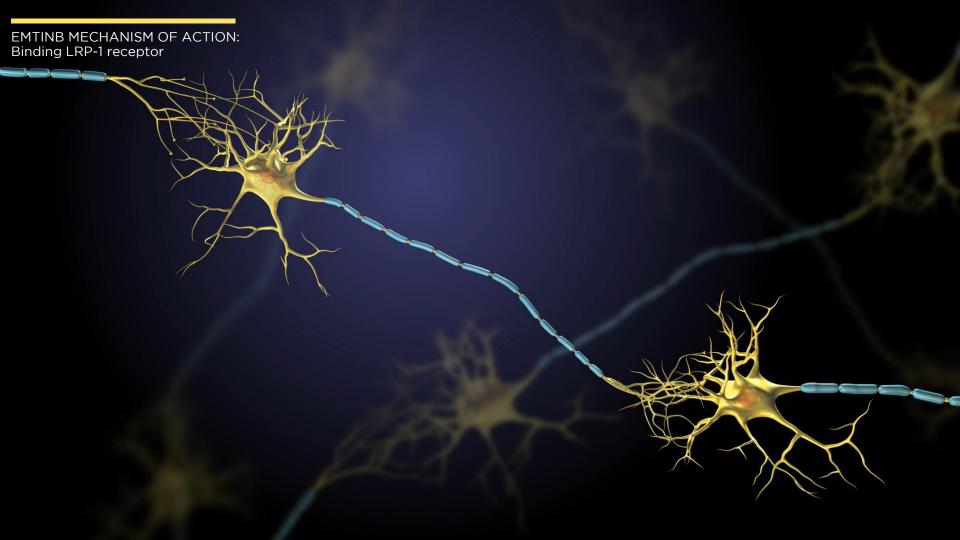
- 14 amino acid length
- Isolated from the β-domain of MT-II protein

EmtinB Peptide Dendrimer



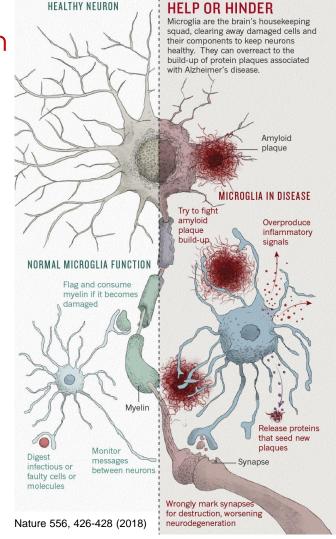
• EmtinB is manufactured as tetrameric dendrimer, in which four monomer peptides (14aa monomers) are linked via a lysine backbone. Since monomer peptides usually demonstrate a short half-life due to rapid proteolytic breakdown, the dendrimer structure increases the stability of EmtinBg in biological environments.





MOA2: Microglia Induced Neuroinflammation in Alzheimer's Disease

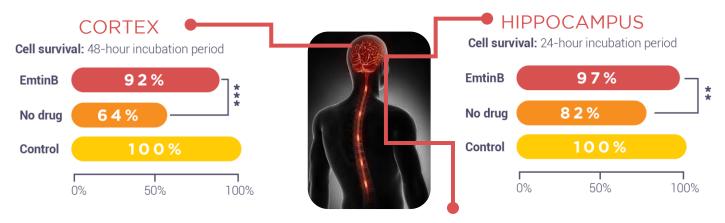
- ▶ Identification of a Unique Microglia Type Associated with Alzheimer's Disease (Disease Associated Microglia)
- ▶ DAM Are Localized near AD Plaques (2017, Cell 169, 1276–1290). DAM are located within the cortex, but not the cerebellum of AD mice
- ▶ In AD, the microglia is able to contribute to the neuroinflammation under the stimulation of A β oligomers and plagues via cell surface receptors. LRP-1 mediates A β phagocytosis in microglia, stimulates inflammatory responses, causing the death of neural cells
- ▶ MTII/EmtinB alters the response of microglia to TNFα; MTII reduce cytokine-stimulated activation of microglia, which would ordinarily impair neurite outgrowth. **This inhibitory effect of MTII on activated microglia is part of EmtinBs MOA** (J Neuroinflammation 2018 15(1) 56)



PRECLINICAL DATA TO DATE

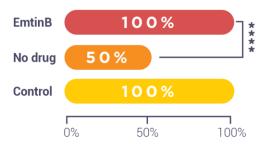


EMTINB SCIENTIFIC DATA Increases survival of neurons



HIPPOCAMPUS: ALZHEIMER'S MODEL

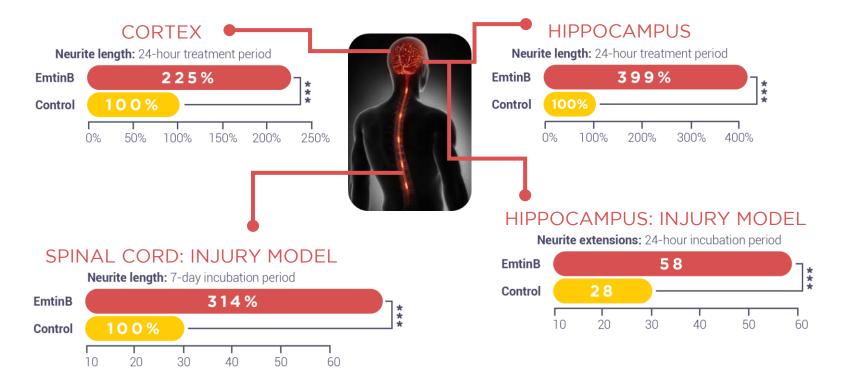
Cell survival: 24-hour incubation period





EMTINB SCIENTIFIC DATA

Preclinical axonal regeneration





EMTINB SCIENTIFIC DATA

Most recent data - Spinal cord injury model

- Primary neurons isolated from spinal cord tissue of adult rats
- EmtinB (30µg/mL) neuron regeneration >300% vs. untreated control
- EmtinB (30μg/mL) neuron regeneration >2x Copaxon®; marketed drug for Multiple Sclerosis
- EmtinB significantly increased synaptic connections (18) vs. control (1.8) and Copaxon® (12)
- EmtinB stimulated longest axon ever recorded in this model

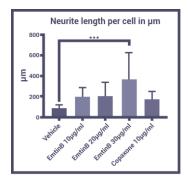


Figure 1: Mean neurite length per cell

***p<0.001 vs. vehicle using one-way ANOVA followed by Tukey test.

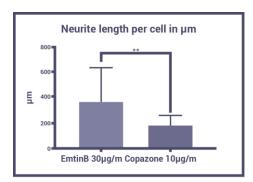
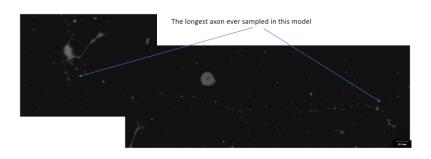


Figure 2: Mean neurite length per cell. EmtinB (30 µg/ml) vs. Copaxone (10 µg/ml).

***p<0.01 vs. Copaxone using T-test.



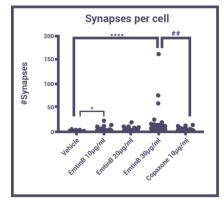


Figure 3: Mean number of synapses per cell.

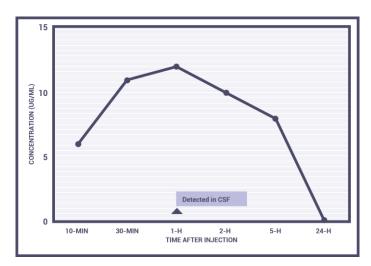
*p<0.05 vs. Vehicle using Kruskal-Wallis test. ##p<0.01 vs. Copaxone 10 µg/ml using Kruskal-Wallis test. ****p<0.0001 vs. Vehicle using Kruskal-Wallis test.



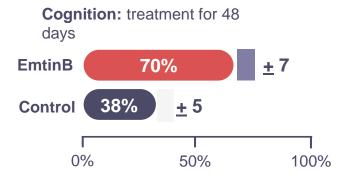
EMTINB SCIENTIFIC DATA

Preclinical studies: animal models

- Plasma profile: was detected 10-min after administration and remained detectable up to the 24-hour time point
- Crosses the blood brain barrier, detected in CSF 1hr after treatment



 Slowed progression of disease (memory impairment) by >80% in Alzheimer's animal model (APPswe/PS1dE9)



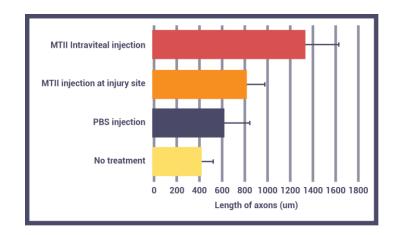


SUPPORTING SCIENTIFIC DATA

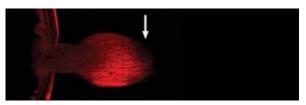
Regenerating the optic nerve

- Precursor to EmtinB (MT-II) stimulated regenerative growth of optic (4 weeks after posttransection surgery, n=16)
- Promotes axonal regeneration through an inhibitory environment in vivo

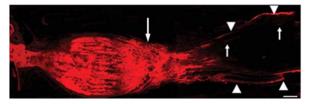
Optic Nerve Growth



No Treatment



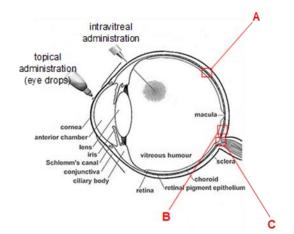
Treatment

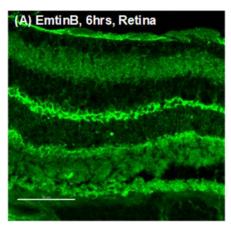


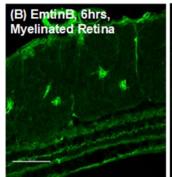


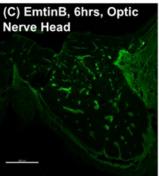
SUPPORTING SCIENTIFIC DATA Regenerating the optic nerve

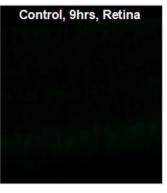
- Precursor to EmtinB (MT-II) stimulated regenerative growth of optic
- data demonstrates the ability of labeled EmtinB to penetrate the retina and optic nerve of the rabbit eye with no side effects
- Next phase of the program will include IOP/CSFp modulation in pig model (to start this month)













STRATEGIC PARTNERSHIPS AND AFFILIATED NETWORK







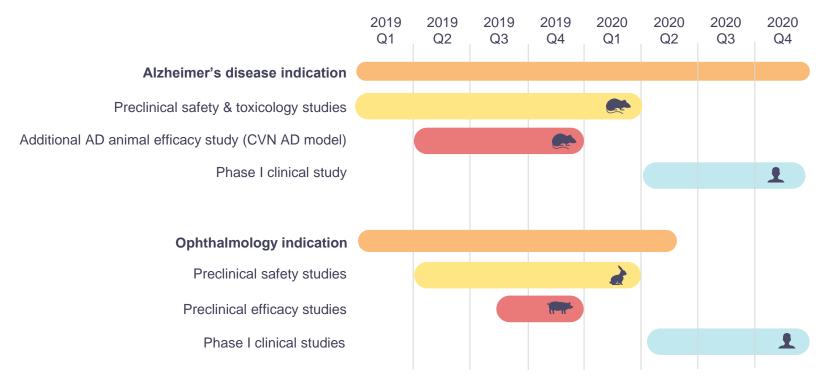






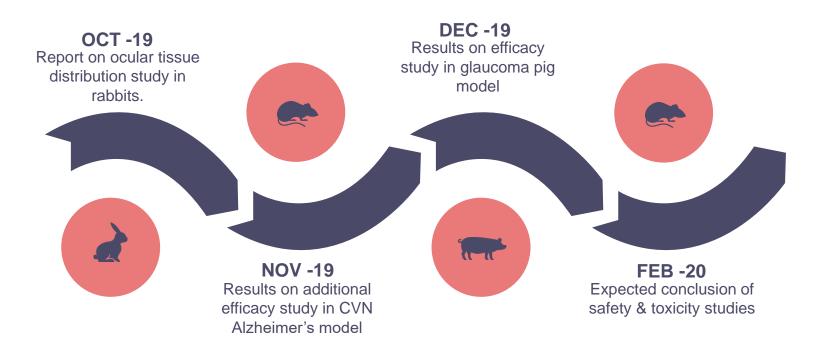


EMTINB DEVELOPMENT SCHEDULE





KEY MILESTONES





NOVEL DRUG THERAPIES FOR NEURODEGENERATIVE CONDITIONS



