



**NeuroScientific**

BIOPHARMACEUTICALS

ASX:NSB

**ASX ANNOUNCEMENT  
26 OCTOBER 2021**

## **NEUROSCIENTIFIC PRESENTING AT BIO EUROPE 2021 AND AUSBIOTECH 2021**

NeuroScientific Biopharmaceuticals Ltd (ASX: **NSB**) (“**NeuroScientific**” or “**the company**”) is pleased to announce its participation in two major industry conferences during this week, beginning with BIO Europe 2021, being held from Monday 25 to Friday 29 October 2021, and AusBiotech Invest 2021, to be held on 26 October 2021.

Chief Executive Officer and Managing Director Matt Liddelow will be presenting at both conferences. A copy of the company presentation is attached.

This announcement is authorised by the Board of NeuroScientific Biopharmaceuticals Ltd.

-ENDS-

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### **About NeuroScientific Biopharmaceuticals Ltd**

NeuroScientific Biopharmaceuticals Limited (ASX: NSB) is a company developing peptide-based pharmaceutical drugs that target a number of neurodegenerative conditions with high unmet medical demand. The company’s product portfolio includes EmtinB™, a therapeutic peptide initially targeting Alzheimer’s disease and glaucoma, as well as other Emtin peptides (EmtinAc, EmtinAn, and EmtinBn) which have demonstrated similar therapeutic potential as EmtinB™. For more information, please visit [www.neuroscientific.com](http://www.neuroscientific.com)

### **About EmtinB™**

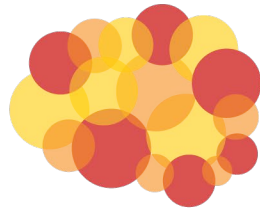
EmtinB™ is a peptide-based compound that binds to surface-based cell receptors from the LDLR family, activating intracellular signalling pathways that stimulate neuroprotection, neuroregeneration and modulate neuroinflammation. EmtinB™ is modelled on a specific active domain of the complex human protein called Metallothionein-IIA, which is produced as part of the human body’s innate immune response to cell injury.

Our preclinical research has established that EmtinB™ is highly specific and selective for its target receptor, safe and well tolerated at high concentrations, and is able to penetrate the blood brain barrier. A series of Phase I clinical studies will be conducted to establish the safety profile of EmtinB™ in humans.

An illustration on a dark blue background shows a white silhouette of a person rappelling down a vertical rope on the left. A beam of light from a flashlight held by the person illuminates a large, glowing yellow neuron with a complex network of dendrites and axons. Other smaller, faint neurons are scattered in the background.

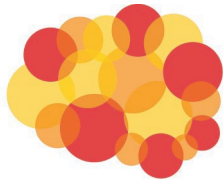
**NOVEL DRUG  
THERAPIES FOR  
NEURODEGENERATIVE  
CONDITIONS**

**Company Presentation  
25 October 2021**



**NeuroScientific**

**BIOPHARMACEUTICALS**



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## 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.

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# NEUROSCIENTIFIC BIOPHARMACEUTICALS LTD

NeuroScientific Biopharmaceuticals Ltd (ASX: NSB) is developing peptide-based compounds that prevent neurodegeneration and stimulate neuroregeneration

**TARGETED PEPTIDES  
WITH BROAD  
THERAPEUTIC  
APPLICATION**

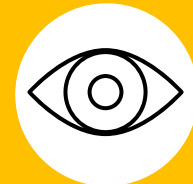
## **NEUROLOGY**

Alzheimer's disease, Multiple sclerosis,  
spinal cord injury



## **OPHTHALMOLOGY**

Glaucoma, optic nerve atrophy,  
optic neuropathies



## PARTNER / INVESTMENT OPPORTUNITY

### NOVEL LEAD COMPOUND

- EmtinB™ - potential first in-class therapeutic for neurodegenerative conditions
- Specific and selective for therapeutic target LRP-1

### VALIDATED SCIENCE

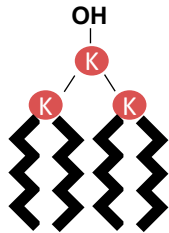
- Lead drug candidate modelled on human MT-II; part of the innate immune response
- Large body of published literature to support MOA

### POTENTIAL FOR MULTIPLE INDICATIONS

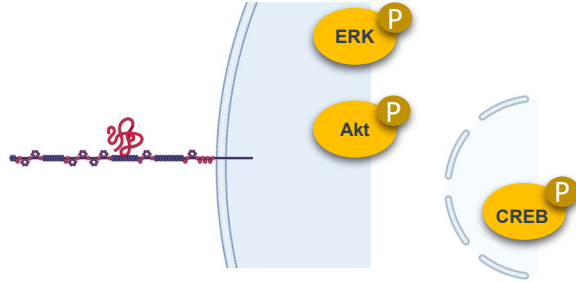
- LRP-1 highly expressed in CNS and PNS
- EmtinB™ - pipeline in product; cells that express LRP-1 can be rescued by EmtinB™
- Other Emtin peptides

# EMTINB™: LRP-1 AGONIST THAT PROMOTES NEURONAL SURVIVAL & REGENERATION

EMTINB



INTRACELLULAR SIGNALLING



Activation of LRP1 stimulates downstream signalling

**Transient activation of ERK & Akt:**

- Neuronal survival
- Axonal regeneration
- Cell-specific differentiation

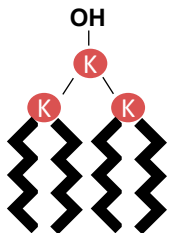
**Sustained activation of CREB:**

- Neuronal survival
- Axonal regeneration
- Neuronal plasticity
- Cell-specific differentiation

# EMTINB™: LRP-1 AGONIST THAT PROMOTES NEURONAL SURVIVAL & REGENERATION

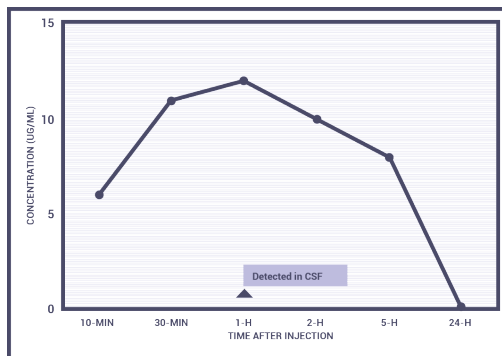
Validation of EmtinB as a lead drug candidate

EMTINB



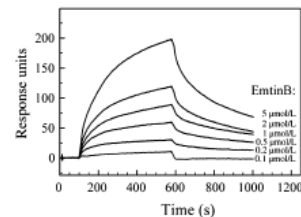
Modelled on  $\beta$ -domain of MTIIA, monomers linked via poly-lysine

## PLASMA PROFILE



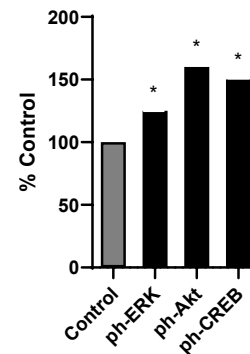
24-h plasma profile and detected in CSF

## BINDING AFFINITY



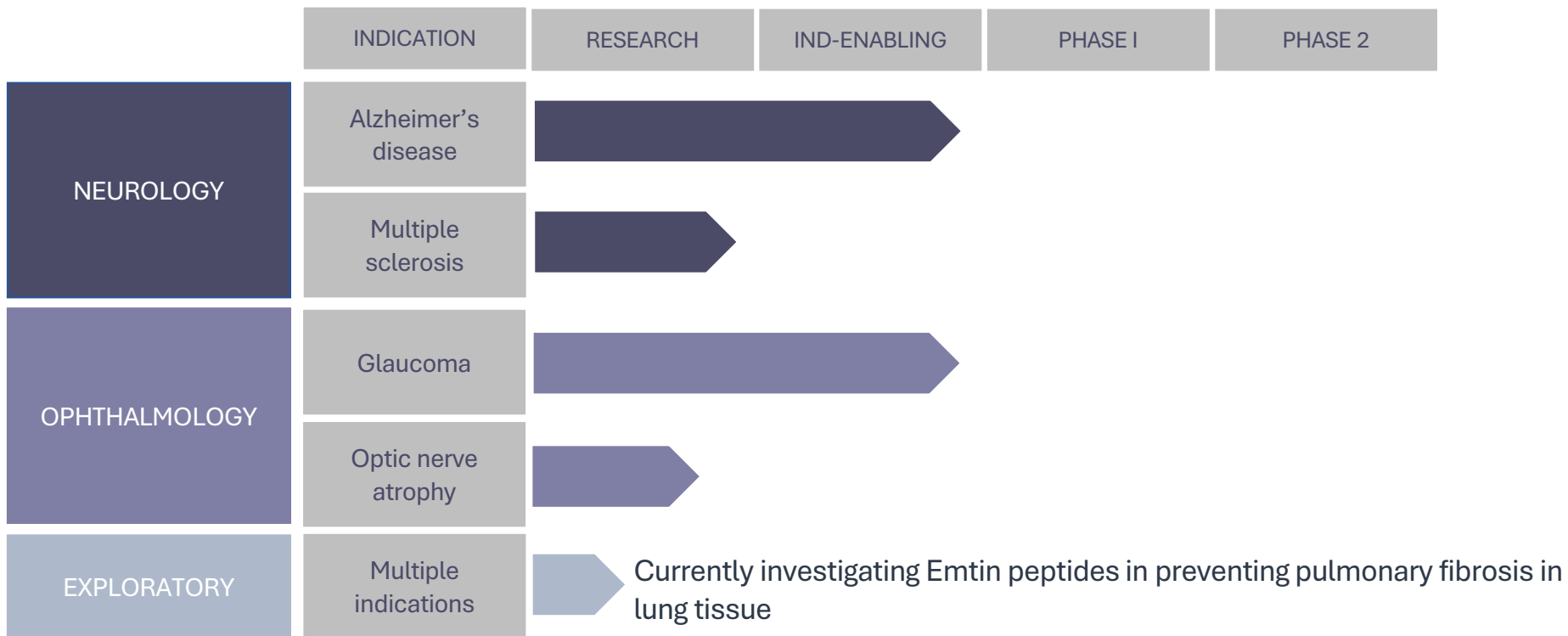
Specificity binds LRP-1 receptor

## SIGNAL TRANSDUCTION



Activation of signalling pathways

# EMTINB™ – PIPELINE IN A PRODUCT





# NEUROLOGY



NeuroScientific  
BIOPHARMACEUTICALS



# NEURODEGENERATIVE CONDITIONS SIGNIFICANTLY CONTRIBUTE TO GLOBAL BURDEN OF DISEASE

## DEMENTIA & ALZHEIMER'S DISEASE

**50M** people globally have dementia

**70%** dementias Alzheimer's disease

Global prevalence driven by aging  
population

**US\$818B** global economic burden



## MULTIPLE SCLEROSIS

**2.5M** global prevalence

**20-50y** age range of diagnosis

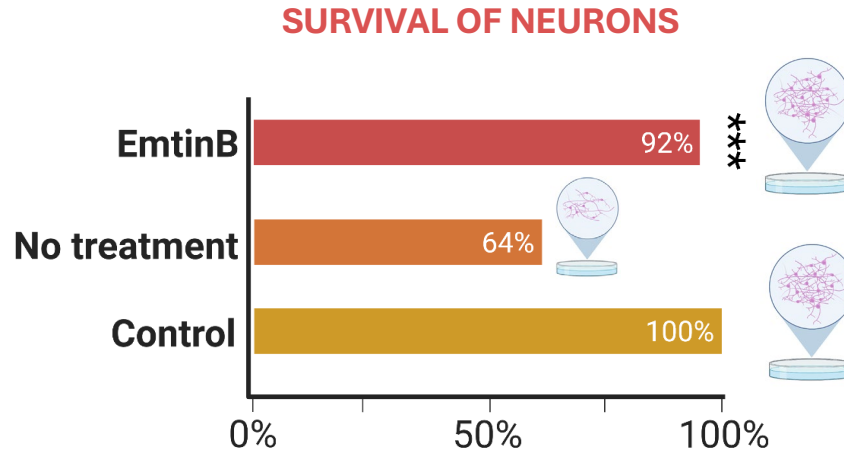
Progressive onset with increasing  
neurological disability

**USA** has one of highest rates of MS



# EMTINB™ PROMOTES NEURONAL SURVIVAL

Increases *in vitro* survival of damaged neurons from different regions of the brain

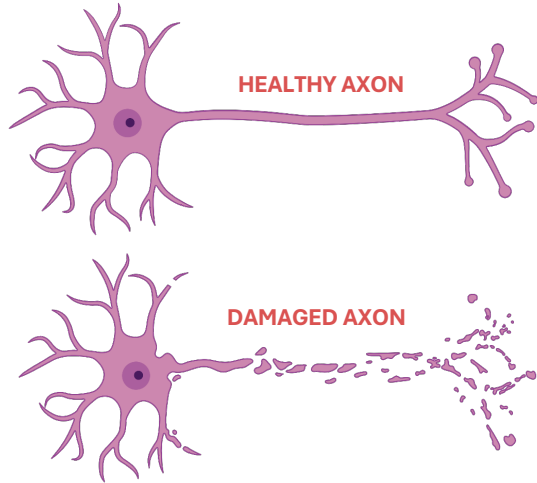


- EmtinB™ has consistently increased the survival of neurons by >90% vs untreated controls
- Survival studies induce cell death before treatment

# EMTINB™ PROMOTES NEURONAL REGENERATION

Increases *in vitro* axonal regeneration in neurons from different regions of CNS

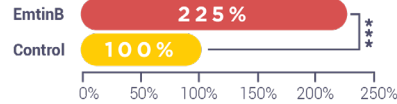
## REGENERATION OF AXONS



## EMTINB™ AXONAL REGENERATION

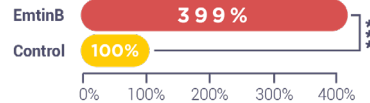
### CORTICAL NEURONS

Neurite length: 24-hour treatment period



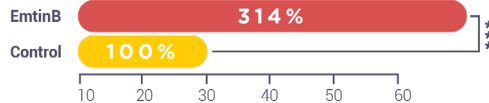
### HIPPOCAMPAL NEURONS

Neurite length: 24-hour treatment period

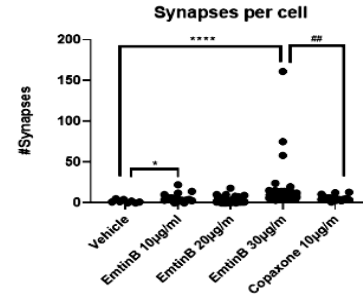


### SPINAL CORD: INJURY MODEL

Neurite length: 7-day incubation period



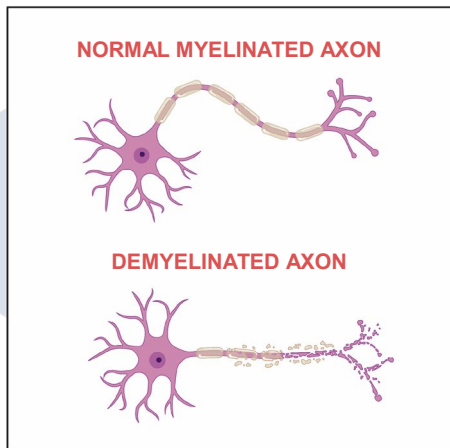
## SYNAPTIC DENSITY



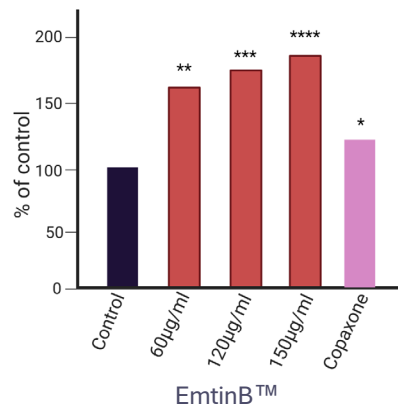
Synaptic density indicates the number of functional signal connections formed by the regenerated axons

# EMTINB™ PROMOTES REMYELINATION IN MULTIPLE SCLEROSIS MODEL

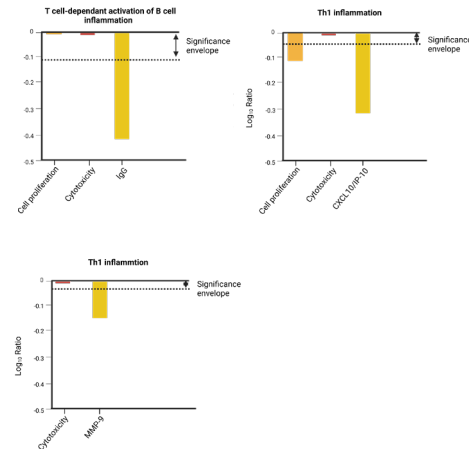
## MULTIPLE SCLEROSIS



## EMTINB™ INCREASED MYELIN



## EMTINB™ REDUCED INFLAMMATION

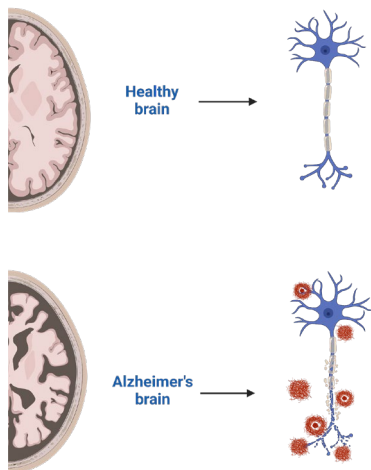


- EmtinB™ increased myelin by >30% vs marketed MS drug Copaxone®
- Significantly reduced inflammation associated with Multiple sclerosis
- Significantly increased survival and regeneration of neurons

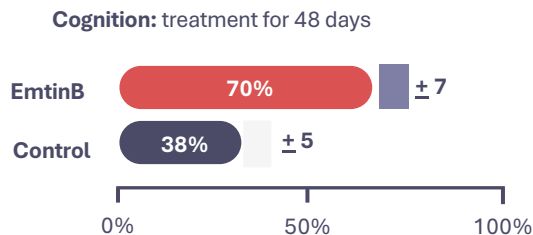
# EMTINB™ SLOWED COGNITIVE DECLINE IN ALZHEIMERS MODEL

Significantly slowed progression of AD in gold standard mouse model (APPswe/PS1)

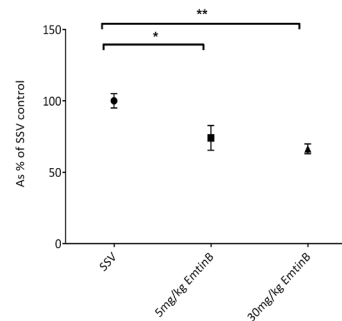
## ALZHEIMER'S DISEASE



## AD MOUSE MODEL

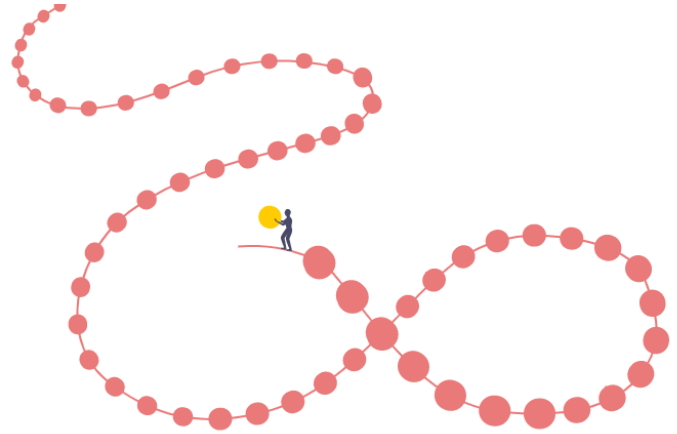


## EFFECT ON ASTROGLIOSIS



- EmtinB™ slowed progression of Alzheimer's disease (memory impairment) by >80%
- Significantly reduced inflammation caused by astrocytes (astrogliosis)

# OPHTHALMOLOGY



# >5% OF GLOBAL POPULATION SUFFER VISION LOSS DUE TO DAMAGED OPTIC NERVE

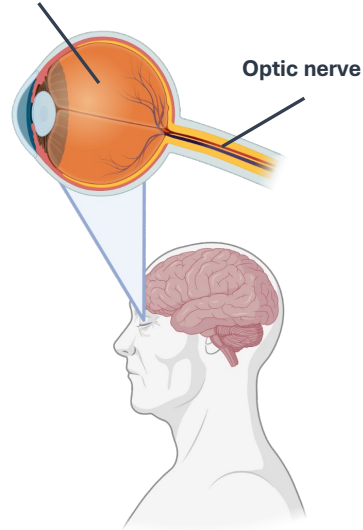
## GLAUCOMA

**76M** global prevalence

**2<sup>nd</sup>** leading cause of blindness

Irreversible damage to the optic nerve results in permanent vision loss

Vitreous humour



## OPTIC NEURITIS

**10M** global prevalence

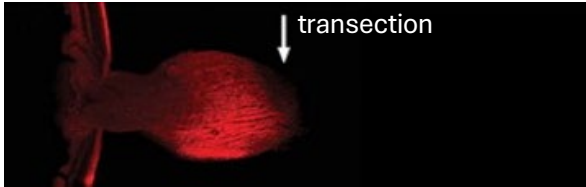
**50%** MS patients affected

Leads to partial or complete loss of vision

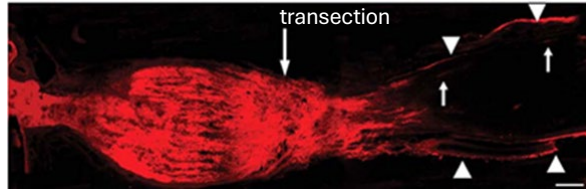


# REGENERATING THE OPTIC NERVE

No Treatment



Treatment



## RAT TRANSECTION MODEL

EmtinB™ precursor compound (MT-II):

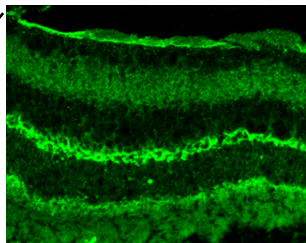
- Stimulated regeneration of fully severed optic nerve by up to 1000um (>250% vs non-treated) from 1 dose
- Axonal regeneration was evident well beyond the transection site at 4-weeks post treatment

# EMTINB™ OCULAR TISSUE PENETRATION

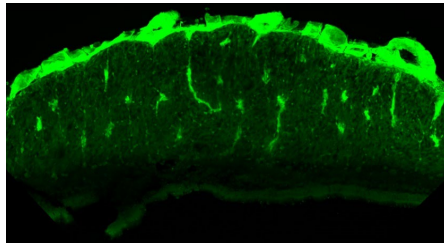
PK and tissue distribution in rabbits administered EmtinB via intravitreal delivery

**Retina:** EmtinB™ labelled with OG488 present in retinal tissue

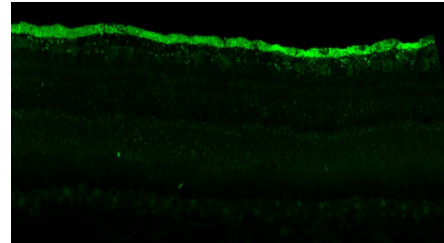
6-hours



24-hours

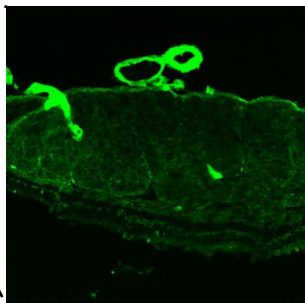


6-days

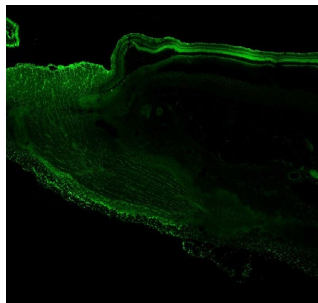


**Optic nerve:** EmtinB™ labelled with OG488 present in optic nerve tissue

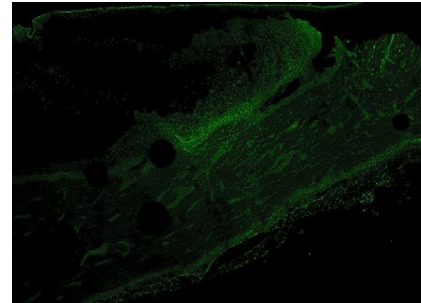
9-hours



24-hours



6-days

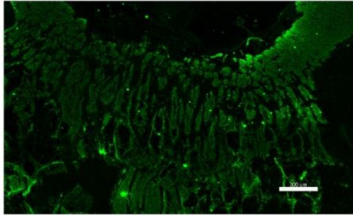


PK studies conducted up to 14-days detected therapeutic concentrations in the vitreous and no systemic leakage at the validated LLOQ

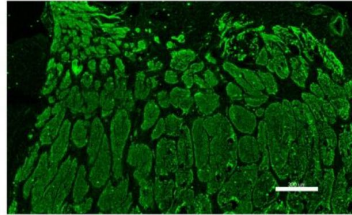
# EMTINB™ IS NEUROPROTECTIVE IN GLAUCOMA

Demonstrated neuroprotection in pig model of IOP glaucoma

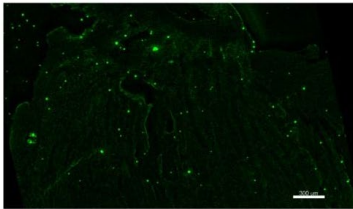
NFHp Non-treatment



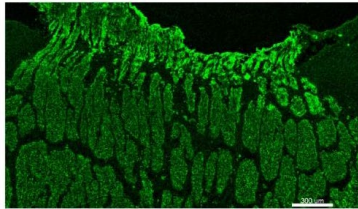
NFHp EmtinB



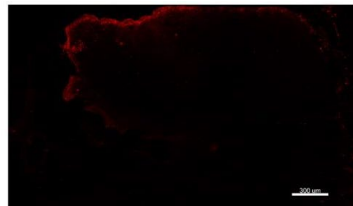
Tubulin Non-treatment



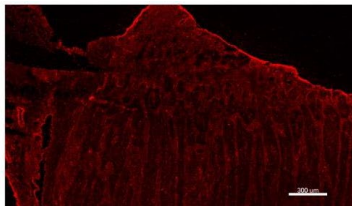
Tubulin EmtinB



MAP Non-treatment

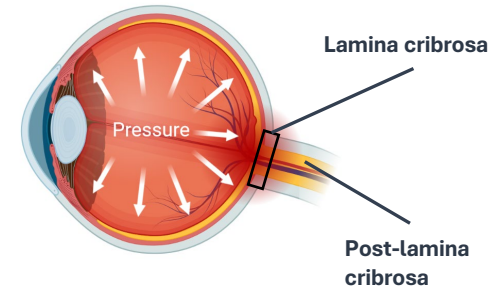


MAP EmtinB



## GLAUCOMA PIG MODEL

- Increased intraocular pressure pig model replicates severe human glaucoma pathology; **positive results in this model indicate disease modifying potential of EmtinB**
- Disruption of cytoskeleton proteins and neurofilaments in neuronal tissue are used as markers for axonal damage; EmtinB treatment significantly increased **NFHp**, **Tubulin** and **MAP** biomarkers of the optic nerve (lamina and post-lamina cribrosa regions)



# FINANCIAL METRICS & MILESTONES



**NeuroScientific**  
BIOPHARMACEUTICALS



# FINANCIAL METRICS & MILESTONES

## FINANCIALS

- IPO on ASX July 2018 (ASX: NSB)
- ~\$13M cash on hand
- Funded through to completion of current Phase I clinical program
- McRae Investments and AlphaSwiss Partners significant shareholders

## TARGET MILESTONES\*

- Q4 2021 – Completion of neurology IND-enabling safety studies
- Q1 2022 – Completion of ocular IND-enabling safety studies
- Q1 2022 – Phase I “first-in-human” clinical study
- Q2 2022 – Phase I glaucoma study

## CAPITAL STRUCTURE

<b>ASX code</b>	NSB
<b>Shares on issue</b>	143M
<b>Price (22/10/2021)</b>	\$0.415
<b>Market cap</b>	\$6M
<b>McRae Investments Pty Ltd</b>	18%
<b>AlphaSwiss Partners</b>	9.0%
<b>Executive Management</b>	5.0%

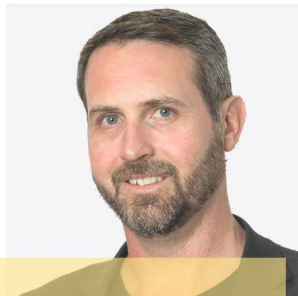
# LEADERSHIP TEAM



**Paul Rennie, MBM, MSTC**

NON-EXECUTIVE CHAIRMAN

Founding and current CEO of Paradigm Biopharmaceuticals (ASX:PAR). Former COO and Executive VP New Product Development at Mesoblast Ltd (ASX:MSB).



**Matt Liddelow, MPharm**

MD + CEO

Founder of NSB, 14+ years experience commercialising medical devices and pharmaceuticals for multinational companies including AstraZeneca



**Anton Uvarov, PhD**

EXECUTIVE DIR + CSO

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



**Stephen Quantrill, MBA**

NON-EXECUTIVE  
DIRECTOR

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

## MANAGEMENT

**Dougal Thring, MPharmMed**  
VP Clinical Development

**Alexandria Heaton, PhD**  
Director of Operations

## SCIENTIFIC ADVISORY

**Clinical Prof. Allan Kermode MBBS MD FRACP FRCP**  
Head, Neurology & Neurophysiology, SCG Hospital, WA Australia  
Head, Demyelinating Disease Research, Perron Inst. Australia

**Prof. Dao-Yi Yu MD FRANZCO**  
Head, Physiology & Pharmacology Research, Lions Eye Inst. Australia

**Dr Frank Bonner, PhD FBTS**  
Former Director, Non-clinical R&D, Novartis

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# SUMMARY OVERVIEW

## NEUROSCIENTIFIC BIOPHARMACEUTICALS LTD (ASX: NSB)

- Drug development company with an advanced preclinical lead candidate called EmtinB; funded through to completion of Phase I program
- EmtinB targets LRP-1 expressed on the outside of neurons and neuroglia; MOA has potential for multiple treatment indications (pipeline in a product)
- EmtinB preclinical data has demonstrated:
  - Neuroprotection in cell survival models >90%
  - Significant axonal regeneration (including significant results in spinal injury rat model)
  - Proliferation of myelin forming cells (oligodendrocytes) and myelin formation in Multiple sclerosis model
  - Slowed cognitive decline in Alzheimer's disease animal models
  - Slowed glaucoma-induced damage to the optic nerve in animal model
  - Advanced safety program in animals, including non-human primates
- Transitioning EmtinB to clinical development in 2022

## FOR MORE INFORMATION:

Matt Liddelow

CEO & Managing Director

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[www.neuroscientific.com](http://www.neuroscientific.com)



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