



## NTCELL – Demonstrates continued reversal of Parkinson's disease

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September, 2016

# SAFE HARBOR STATEMENT

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This document contains certain forward-looking statements, relating to LCT's business, which can be identified by the use of forward-looking terminology such as "promising", "plans", "anticipated", "will", "project", "believe", "forecast", "expected", "estimated", "targeting", "aiming", "set to", "potential", "seeking to", "goal", "could provide", "intends", "is being developed", "could be", "on track", or similar expressions, or by express or implied discussions regarding potential filings or marketing approvals, or potential future sales of product candidates. Such forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause actual results to be materially different from any future results, performance or achievements expressed or implied by such statements. There can be no assurance that any existing or future regulatory filings will satisfy the FDA's and other health authorities' requirements regarding any one or more product candidates nor can there be any assurance that such product candidates will be approved by any health authorities for sale in any market or that they will reach any particular level of sales. In particular, management's expectations regarding the approval and commercialisation of the product candidates could be affected by, among other things, unexpected clinical trial results, including additional analysis of existing clinical data, and new clinical data; unexpected regulatory actions or delays, or government regulation generally; our ability to obtain or maintain patent or other proprietary intellectual property protection; competition in general; government, industry, and general public pricing pressures; and additional factors that involve significant risks and uncertainties about our products, product candidates, financial results and business prospects. Should one or more of these risks or uncertainties materialise, or should underlying assumptions prove incorrect, actual results may vary materially from those described herein as anticipated, believed, estimated or expected. LCT is providing this information as of the date of this presentation and does not assume any obligation to update any forward-looking statements contained in this document as a result of new information, future events or developments or otherwise.

# LCT - key statistics and significant shareholders

## Key statistics as at 25 August 2016

<b>ASX code</b>	<b>LCT</b>
<b>Share price</b>	<b>\$0.093</b>
<b>Share price range 2016</b>	<b>\$0.042 - \$0.11</b>
<b>Shares on issue</b>	<b>496,488,328</b>
<b>Market capitalisation</b>	<b>\$46m</b>
<b>Options issued</b>	<b>7,115,000</b>

## Share register

<b>Top 20</b>	<b>56%</b>
<b>Total number of shareholders</b>	<b>2,471</b>
<b>Small parcel holders</b>	<b>581</b>
<b>Geographic shareholding split</b>	
<b>Australia</b>	<b>48%</b>
<b>New Zealand</b>	<b>36%</b>
<b>Japan</b>	<b>5%</b>
<b>Other</b>	<b>11%</b>

# LCT – twenty largest shareholders

<b>Twenty largest shareholders at 15 August 2016</b>	<b>Number held</b>	<b>% of issued shares</b>
National Nominees Limited	54,347,355	11
HSBC Custody Nominees (Australia) Ltd	26,027,321	5
Otsuka Pharmaceutical Factory, Inc.	25,000,000	5
Navigroup Management Limited	20,213,249	4
Investment Custodial Services Limited	18,843,092	4
Waiaua Bay Farm Limited	16,548,092	3
Peter C Cooper and Susan E Cooper	14,705,195	3
Jiangsu Aosaikang Pharmaceutical Co	14,334,080	3
ABN Amro Nominees Pty Limited	11,273,501	2
Masfen Securities Limited	9,876,137	2
Citicorp Nominees Pty Limited	9,325,777	2
Peter C Cooper	9,195,670	2
Forsyth Barr Custodians Limited	8,100,723	2
Lane Capital Group Limited	7,133,147	1
4 Eyes Limited	5,307,200	1
Michelle A Paine	5,305,000	1
Natalie Parke Trustee Limited	5,149,537	1
SC Trustee Limited	5,149,537	1
Foundation Services Limited	4,977,626	1
Vulcan Capital Limited	4,860,007	1

# Billion dollar market for first PD disease modifying drug

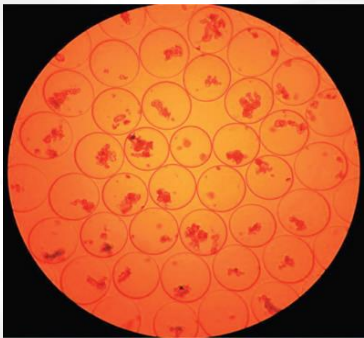
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- ❖ 7–10 million people living with Parkinson’s disease (PD) worldwide
- ❖ Incidence of PD increases with age.
- ❖ But 19% diagnosed aged 15 – 64 and withdraw from workforce.
- ❖ 64,000 Australians affected by PD. Double in 20 years
- ❖ No disease modifying treatment or cure currently available
- ❖ Symptomatic treatments available but limited duration of efficacy
- ❖ PD drug sales totalled \$2.4B in 2014. All symptomatic treatments.
- ❖ Levodopa “gold standard” - 50 years old

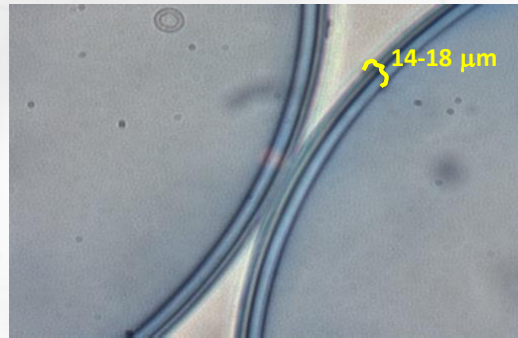
# NTCELL is encapsulated choroid plexus cells

## ❖ Designated pathogen-free herd of Auckland Islands pigs

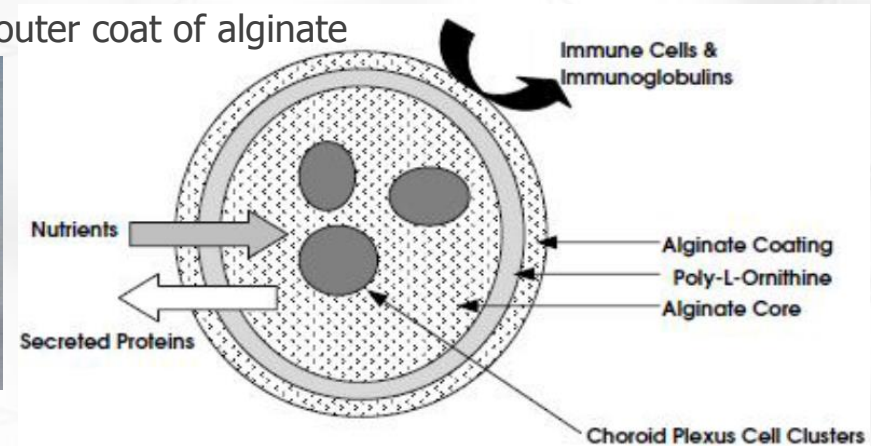
- Surgical removal of the brain from anaesthetised and exsanguinated pathogen free animals
- Enzyme digestion by collagenase and protease to make CP cell free clusters
- CP cell-free clusters entrapped in calcium-alginate gel, coated in positively charged poly-L-ornithine and then layered with an outer coat of alginate



NTCELL alginate microcapsules containing porcine choroid plexus cells



Diameter: ~ 600µm



The structure of the alginate microcapsules containing CP cells. The membrane excludes large globular proteins (>80,000 Da) and all cells, but nutrients, oxygen and carbon dioxide can diffuse freely and secreted proteins (<80,000 Da) can diffuse out.



## Multiple actions = reprogram brain not cells

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- ❖ Secretes cerebrospinal fluid (CSF) containing many bioactive molecules to maintain health and support homeostasis in the brain
- ❖ Provides neurotrophic factors
- ❖ Provides neuroprotective factors
- ❖ Removes toxins (drugs, metals, etc.)
- ❖ Clears waste products
- ❖ Forms a blood-CSF barrier
- ❖ Total volume of CSF in adult human: ~140-270 mL
- ❖ CSF production: ~600-700 mL per day
- ❖ CSF turnover: 1.5 – 4 times per day (slows down with aging)

## NTCELL - 20 years patent protection.

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Patent filed US and PCT Rest of the World May 13, 2016

“Treatment of CNS disease with encapsulated inducible choroid plexus cells”



## Treatment of Parkinson's disease

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### ❖ The rationale for NTCELL treatment

- Encapsulated porcine choroid plexus cells offer a “factory” approach for nerve growth: only one treatment
- Personalized therapy: NTCELL adapts to disease *in vivo*
- Reliable supply: Porcine advantage over human
- Immuno-privileged target: Xenotransplant safe and not rejected

### ❖ Advantage over stem cells

- NTCELLs are natural, not reprogrammed by DNA, RNA manipulation..
- No concern of tumorigenicity
- Defined cell population, QA specs rather than unknown mixed cell types
- No current stem cell technology able to generate choroid plexus cells
- Manufacturing cost acceptable

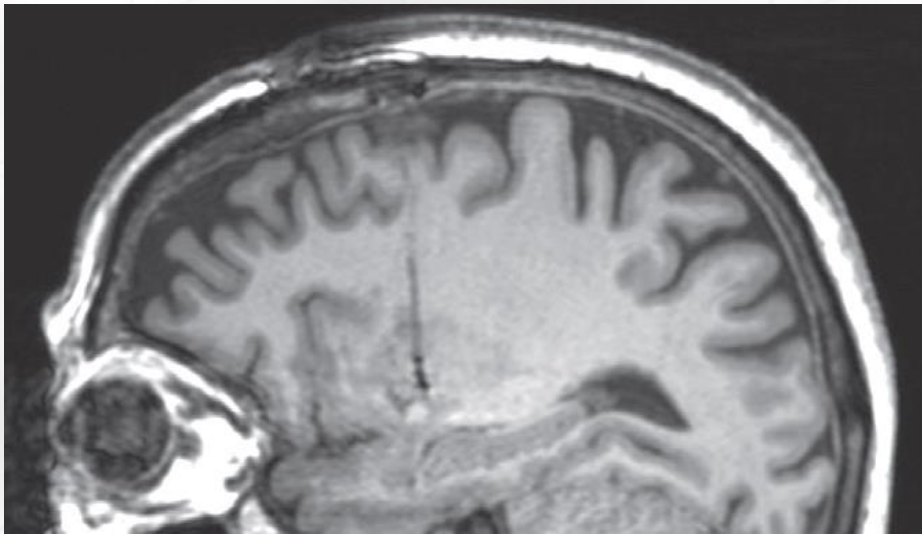
# Clinical Development

## Phase I/IIa Data - Protocol

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### ✦ Protocol

- 4 PD patients previously selected for DBS treatment
- 40 NTCELL microcapsules (c. 40,000 CP cells) implanted into the putamen on the side contralateral to that of the greatest clinical deficit



Sagittal MRI showing the cannula tract. Implanted

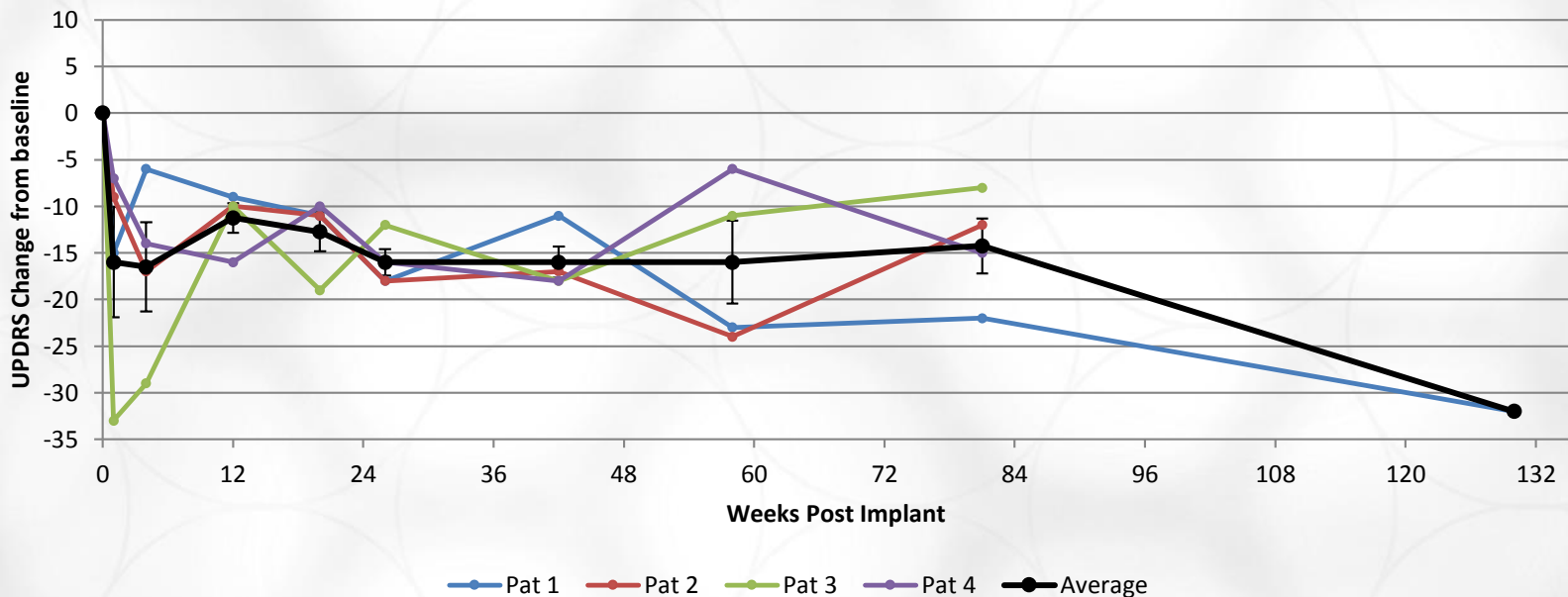
NTCELL microcapsules are distributed through the putamen at the end of the tract



# NTCELL. "Improved every rating scale in first 4 patients" Dr Barry Snow, Principal Investigator

❖ Decrease in UPDRS is clinically and statistically significant

**Total Unified Parkinson's Disease Rating Scale (UPDRS)  
with patients off medication**



# Phase I/IIa Data – NTCELL safe and stopped the progression of Parkinson’s Disease

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- ❖ All implants well tolerated  
NTCELL administered via unilateral implantation into the putamen of four patients with PD is safe and well tolerated (the primary endpoint)
- ❖ No relevant NTCELL–related adverse events  
No adverse events related to NTCELL. No clinical or laboratory evidence of PERV transmission in patients or partners
- ❖ Progression of PD halted  
In all four patients NTCELL treatment has stopped the progression of PD as measured by globally accepted and validated neurological rating scales
- ❖ Improvement in neurological score  
In all four patients the 42 week post-implant data (as seen in the UPDRS, UDysRS and PDQ-39) show there is a clinically and statistically significant improvement in the patients’ neurological score from their pre-implant baseline
- ❖ Equivalent of five years remission from PD  
That improvement is equivalent to approximately five years of PD remission and is maintained 2 years after NTCELL transplant in the first patient
- ❖ Encouraging results justify a confirmatory study  
Second clinical trial of NTCELL designed to confirm its potential as a disease modifying treatment for patients with PD

# NTCELL confirmatory Phase IIb trial in progress.

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## **A placebo-controlled, randomised, double-blind trial to assess the safety and efficacy of NTCELL in subjects with PD**

- ❖ Qualification for provisional (fast track) consent to market.
  - ⦿ Define efficacy and any placebo contribution
  - ⦿ Define optimal dose of NTCELL implantation
  - ⦿ Define initial target Parkinson's disease patient subgroup
- ❖ Extension of current study protocol
  - ⦿ 18 patients
  - ⦿ UPDRS endpoint
  - ⦿ Study period – Q2 2016 – Q4 2017
  - ⦿ Target provisional consent submission to launch NTCELL in New Zealand – 2018

# Phase IIb Design – confirm NTCELL dose, efficacy, target indication

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- ❖ Group 1: Patients 1-6
  - ⦿ 4 dosed and 2 placebo, randomly assigned
  - ⦿ 40 NTCELL microcapsules ( $\pm 5\%$ ) bilaterally  
[total of 80 microcapsules], or placebo [sham surgery]
  
- ❖ Group 2: Patients 7-12
  - ⦿ 4 dosed and 2 placebo, randomly assigned
  - ⦿ 80 NTCELL microcapsules ( $\pm 5\%$ ) bilaterally  
[total of 160 microcapsules], or placebo [sham surgery]
  
- ❖ Group 3: Patients 13-18
  - ⦿ 4 dosed and 2 placebo, randomly assigned
  - ⦿ 120 NTCELL microcapsules ( $\pm 5\%$ ) bilaterally  
[total of 240 microcapsules], or placebo [sham surgery]
  
- The study will be unblinded upon completion of the 26-week follow-up period
- The placebo patients will receive the optimal dose of NTCELL after trial period



## Next steps

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- ❖ Complete Phase IIb study
- ❖ Target 2018 market authorisation and launch in New Zealand
- ❖ 2017 confirm plan for global commercialisation, partnership
- ❖ Pipeline. Confirm next targets. Alzheimer's and/or Huntington's disease

# LCT Personnel and Advisors

## Living Cell Technologies

**Ken Taylor, PhD**

*CEO*

**Kathleen Durbin, PhD**

*Head of Clinical and Regulatory*

**Janice Lam, PhD**

*Head of Operations*

**Sarah Carley, PhD**

*Quality Assurance Manager*

## Auckland Clinical Site

**Barry Snow, FRACP**

*Principal Investigator, Neurologist*

**Mark Simpson, FRACP**

*Investigator, Neurologist*

**Ari Bok, FRACS**

**Patrick Schweder, FRACS**

*Neurosurgeons*

**DSMB**

*Prof Tim Anderson (Neurologist, Chair); Dr Rod Ellis-Pegler (ID); Dr Andrew Hughes (Neurologist)*

## Scientific Advisors

**Anne B Young, MD**

*Professor of Neurology, Harvard Medical School, Boston, USA*

**Roger Barker, MD**

*Professor of Clinical Neurosciences and Deputy Director, John van Geest Centre for Brain Research, University of Cambridge, UK*

**Richard Faull, MBChB, PhD**

*Professor of Anatomy and Director, Centre for Brain Research, University of Auckland, NZ*