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# A NEW NAÏVE EMBRYONIC STEM CELL

A new naive embryonic stem cell for treating neurological conditions

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## Benefits

- Increased pluripotency
- Enhanced differentiation capacity
- Other scientific and technical advantages.

## Background

Embryonic stem cells (ESCs) offer considerable promise for treating a range of diseases and injuries including neurological disorders which arguably constitute the largest market sector. However, it is now recognised that existing human ESCs (as well as induced pluripotent stem cells (IPSCs)) are not the same as those originally isolated in mice (naïve ESCs) but more like mouse epiblast or primed ESCs. While primed mouse ESC can be differentiated to various cell types, these cells do not make chimaeric mice when injected into blastocysts suggesting they are not as pluripotent as naïve cells. This has led to the suggestion that naïve Human ESCs will be required if the potential of ESCs for treating disease and injury is to be realised.

It is increasingly recognised that primed human ESCs produce functionally immature cell types. Naïve Human ESCs have been isolated by using up to five differentiation inhibitors to revert primed ESCs (and IPSCs) back to the naïve state. These conditions have also been used to isolate ESCs directly from embryos. However, there are questions marks over the extent of their naivety, with some lines shown to be chromosomally abnormal. These lines are experimental and not available to researchers; as such new methods are required to isolate naïve ESC lines so their potential can be evaluated.

## Technology overview

We have developed a new method for isolating naïve human ESCs. This differs from those developed previously for naïve ESCs in that it does not use differentiation inhibitors. Instead ESCs are isolated one stage earlier in embryo development which may confer further advantages. These cells have been differentiated to various cell types including neural stem cells (Figure 1).

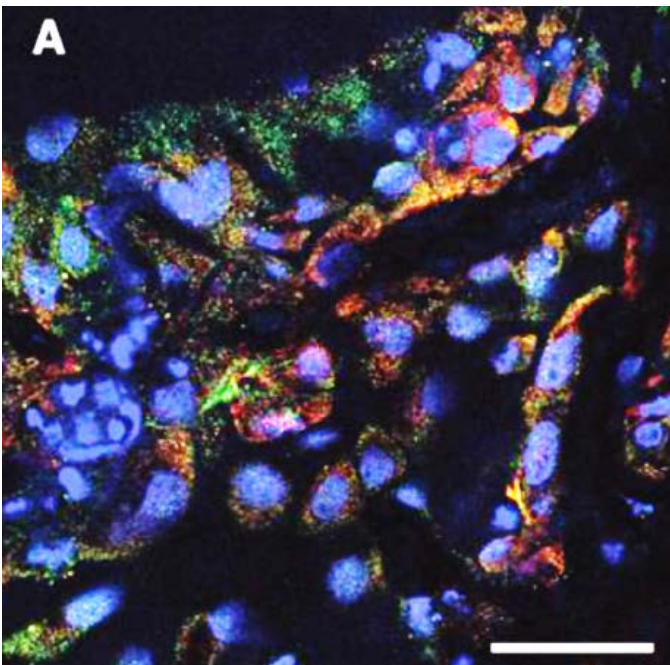


Figure 1. Differentiation of naïve porcine ESCs to various neuronal cell types including neural stem cells (red) and astroglial cells (green).

## Applications

Neurological conditions such as stroke, Spinal cord injury, Parkinson's, Alzheimer's, Cerebral Palsy and spinal muscular atrophy.

## Opportunity

We aim to show that naïve human ESCs produce superior neural stem cells for the treatment of various conditions compared with existing primed Human ESCs.

## Technological development

- Complete in vitro characterisation of pig neural stem cells
- Generate naïve Human ESCs
- Generate neural stem cells from naïve Human ESCs
- Determine functionality of neural stem cells in vitro and in vivo (e.g. rodent model of Parkinsons disease).

## Commercial Development

We are seeking an industry partner who is actively involved in developing cell-based therapies for neurological disorders. We are open to commercial license of the technology, partnership or trade-sale.

## IP Status

WO/2008/049161 'Method for the isolation of pluripotent cells from a pre-implantation embryo in a culture medium free from animal serum'. Granted Australia, USA, Canada. Pending Europe.

## Inventors

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