MONASH University

ARMI AUSTRALIAN REGENERATIVE MEDICINE INSTITUTE

Barberi Group

The group is focused on methods to isolate tissue restricted-stem/precursor cells originating from hESC that will eventually have therapeutic applications. Using ESC as a research tool, we aim to address fundamental questions in development, such as uncovering mechanisms of cell fate and tissue specification. In particular, we are interested in the specification of the mesoderm, as well as in neural crest specification during early neurulation.

A/Prof Tiziano Barberi

A/Prof Barberi is at the forefront of embryonic stem cell research, with outstanding achievements in directing stem cells to become skeletal muscle. He is responsible for new ways to direct the 'cell fate' of embryonic stem cells—transforming them into fat, bone, cartilage or muscle cells. His research aims to develop new therapies to treat and prevent a range of degenerative illnesses. Specifically, A/Prof Barberi will continue his research into muscular dystrophy, as well as his neuroscience investigations.

Research Themes

Skeletal muscle development from hESCs

- Identification and isolation of striated myogenic precursors
- In vitro terminal differentiation of the precursors into mature myocytes
- Transplantation of ESC-derived muscle cells into animal models of myopathies

Differentiation of hESCs into retinal cells

- Optimization of culture conditions for forebrain development
- Role of growth factors in inducing retinal cell differentiation
- Differentiation of hESCs into specialized retina cell subtypes (RPE, neural retina)
- Transplantation of the cell subtypes into an animal model of eye disease

Reconstructing the human neural crest in vitro from hESCs

- Identification and isolation of neural crest precursors (cephalic and truncal)
- In vitro differentiation into specific neural crest derivatives
- Role of microRNAs in the development of the neural crest

Use of mESC mutants to elucidate the function of genes involved in neural development

- Role of SCL/Tal1 during neural development in mESCs
- Effect of Wnt-1 overexpression in mESC differentiation

For further information contact
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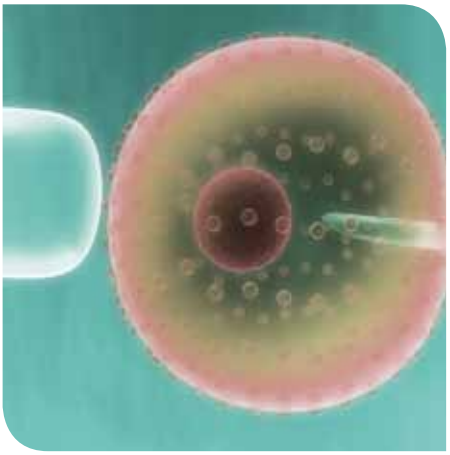
Because of their early embryonic origin, pluripotent stem cells (embryonic stem cells or ESC) have the ability to differentiate virtually into all the cell and tissue types of our body. This ability makes human ESC (hESC) a potential unlimited source of cells to be used for cell replacement therapy in the treatment of a variety of degenerative diseases.



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