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STEM CELL THERAPY REGENERATIVE MEDICINE

Stem cells are cells produced in the body that have the remarkable potential to develop into many different cell types in the body during early life and growth. In addition, in many tissues they serve as a sort of internal repair system, dividing essentially without limit to replenish other cells as long as the person or animal is still alive. When a stem cell divides, each new cell has the potential either to remain a stem cell or become another type of cell with a more specialised function, such as a muscle cell, a red blood cell, or a brain cell.

There are three types of stem cells:

Tissue stem cells

Tissue stem cells – also sometimes called adult stem cells – are derived from foetal or adult tissue. Usually they can only give rise to the cells of that tissue. In some tissues, these cells sustain turnover and repair throughout life. For example, stem cells that are found in the skin will produce new skin cells, ensuring that old or damaged skin cells are replenished.

Embryonic stem cells

These cells are derived from a group of cells within a human embryo that is 5-6 days old. Embryonic stem cells are able to form all the different types of cell in the body.

Induced pluripotent stem cells (iPS cells)

Recently, a third type of stem cell, with properties similar to embryonic stem cells, has emerged. Scientists have engineered these induced pluripotent stem

cells (iPS cells) by 'reprogramming' cells back to a pluripotent state. These pluripotent stem cells have the ability to form different cell types. The Nobel Prize in Medicine was awarded in December 2012 to Shinya Yamanaka for this discovery.

Cell therapy research for inherited retinal disease

Stem cell technology holds great potential for improving the sight of people with a vision impairment, particularly to replace photoreceptors that have been lost due to degeneration. A number of studies are currently being undertaken in order to develop new therapies to treat or prevent loss of vision.

Stem cell therapy projects supported by Retina Australia

Retina Australia has supported some stem cell therapy projects through its annual grant program in recent years.

Global stem cell research

Stem cell clinical trials are currently very much in their infancy for retinal degenerations, but there are a number of clinical trials underway.