

Regenerative medicine 101

What are stem cells?

Stem cells are the master cells of the human body. What differentiates stem cells from other cells is their ability to self-generate and their ability to differentiate into other cell types.

Stem cells are at the center of a new field of science called regenerative medicine. All stem cells, regardless of their source, have three general properties:

- They are capable of dividing and renewing themselves for long periods
- They are unspecialized
- They can give rise to specialized cell types

Self-regeneration is the ability of stem cells to divide and produce more stem cells. During early development, the cell division is symmetrical i.e. each cell divides to give rise to daughter cells each with the same potential. Later in development, the cells divide asymmetrically with one of the daughter cells produced - a stem cell and the other a more differentiated cell (such as brain cell, blood cell, etc.)

When stem cells are transplanted into the body and arrive (through migration or through direct injection) to the injured part of the brain being targeted for tissue regeneration, the stem cells come into contact with growth chemicals in the body. These chemicals program the stem cells to grow into the tissue surrounding it.

Stem cells can typically be divided into four types:

- Embryonic stem cells - Stem cells taken from embryos (illegal)
- Fetal stem cells- Stem cells taken from fetal tissue lines *
- Umbilical stem cells - Stem cells taken from umbilical cords
- Adult stem cells - Stem cells taken from adult tissue

*Please note that China Connection Global Healthcare does not engage in use of fetal stem cells derived from clinical abortion. We will allow use of fetal stems derived as a result of spontaneous miscarriage. These stem cells are subjected to rigorous testing procedures to assure quality is maintained.

The Type of stem cells used by Wu Medical Center

3 main types of stem cells are being used:

- hRPE Stem Cells (Adult Retinal Stem Cells) Used for: Parkinson's Disease
- Bone Marrow Stem cells (Adult Bone Marrow stem cells extracted from the patient's own bone marrow) Recommended for young patients with a weak immune system.
- Neural Stem Cells (derived from fetal stem cells lines) used for: Cerebral Palsy, Brain Injury, Stroke, Degenerative Diseases, and other neurological disorders.

What are hRPE Stem Cells?

hRPE (Human Retinal Pigment Epithelial) Stem Cells, are adult multipotent stem cells that are found in the retina of the human eye. The original function of these special cells is producing Dopamine that participates in the pigmentation process inside the retina.

Due to their function, hRPE cells are a new and most promising solution for Parkinson's Patients who suffers from degeneration of their Dopamine-producing cells. Dopamine is a neuro-transmitter in our brain that supports our movement fluidity and continuity. hRPE cells can replace degenerated dopamine-producing neurons in the nigrostriatal pathway and provide a source of increased dopamine production to promote functional recovery in Parkinson's patients.

The hRPE cells are derived from a single donor, then cultured in the laboratory to produce the amount and the type of cells fitting for implantation.

While the treatment can not completely remove all symptoms of the disease, it can greatly reduce the tremors, decrease muscle tension and rigidity, improve movement continuity, movement initiation and balance, increase muscle strength, improve slurred speech, reduce the freeze ups and strengthen the overall body.

Every patient who wishes to apply for this treatment will undergo a thorough evaluation process.

What are Bone Marrow stem cells?

Bone marrow stem cells are the most primal cells in the marrow. From them all the various types of blood cells are descended. Stem cells from bone marrow can also, under special conditions provided in the laboratory, give rise to non-marrow cells - such as neural cells.

Bone marrow cells, unlike other types of stem cells, are available to be extracted from the patient's own body. This availability carry very significant advantages for certain medical conditions: bone marrow cells, when extracted from the patient's own body, have no risk of stimulating the immune system. This advantage is crucial when the patient's immune system is weak.

In medical conditions such as Multiple Sclerosis, certain brain infections, seizures and epileptic disorders or at any condition when the immune system is weak - bone marrow stem cell implantation will be recommended.

The procedure of Bone Marrow culturing and implantation:

On the first week of the patient's arrival to the hospital, bone marrow is extracted from the patient's hip in a short and simple operation. This procedure is not painful and is done under a local anesthesia. The bone marrow cells are then sent to the lab and cultured and grown for 3-4 weeks. In the lab, the cells are converted to neural stem cells and then cultured to increase their number. The number of stem cells will be depending on the patient's age and the level of bone marrow activity.

Within a month of the bone marrow extraction, the cells will are then reintroduced (injected) back into the patients' body via lumbar puncture. (3-4 injections)

What are Neural Stem Cells?

Neural Stem cells are self-regenerating, multipotent cells, found in the human brain which have the potential to differentiate into three major cell types: nerve cells (neurons), astrocytes and oligodendrocytes, and to self renew sufficiently to provide adequate number of cells in the brain.

When brain cells are damaged or are dying, due to a disease or an injury, fetal stem cells lines are the best known source for human neural stem cells.

Since most brain injuries, stroke, degenerative diseases and Demyelinating disorders affect several areas in the brain and not only one, the most effective and safe procedure to deliver neural stem cell into the brain is via a Lumbar Puncture (also called Spinal Tap): a spinal injection in the lumbar area (lower back) into the CSF (Cerebral Spinal Fluid).

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About Sino Cells Bio Technologies Co., Ltd

Stem cells used at Wu Stem Cells Medical Center come from Sino Cells Bio Technologies Research Centre laboratories. Sino Cells Bio Technologies research center is the most renowned stem cell center in China, which holds the top level international researchers team reputation.