

MACHON PUAH

The Stem Cell Revolution

I was at a recent conference held in Poria Hospital in Tiveria that dealt with the science and application of stem cell research.

Stem cells have become a hot topic both in the scientific community and in the popular press as they seem to promise novel medical treatments for a variety of ailments and conditions. Stem cells are the basic building block of the body and can become any other cell. We can imagine them something like one Lego brick. Before we use it to build something it can become many different elements of our eventual creation. When it is eventually used and placed in a Lego building or a car it now has a specific use and purpose. Similarly the embryo is made up of cells that initially are pluripotent, which means that they can become any cell of the body. These cells go through a process called differentiation in which through biochemical changes they become viable as a specific cell. A cell in the embryo has not yet differentiated but when it does it can become a cell in the heart, in blood, the liver, skin etc.

In recent years scientists have been able to identify these stem cells and create an environment in the laboratory that mimics the natural differentiation process. In so doing they can form cells that can now become heart, skin, liver, blood etc. The therapeutic potential is vast since these cells can now be introduced into the person needing heart treatment and replace the defective heart cells, or the nervous system or the immune system, or any other organ. This heralds a phenomenal revolution for medicine which has only just started.

At the conference there were discussions

about treated defective hearts, cartilage and even protection against chemical warfare using these multi-faceted cells.

The question is the source of these cells, where can we get them?

There are stem cells in bone marrow, as well as in blood and fat cells, however the best source is embryonic cells that have a much greater range of possibilities than these other cells. But there are not that many embryonic stem cells available for scientific and medical use. Some of them are frozen embryo created by couples during fertility treatment, but many of these couples still need these embryos for later treatment and are not willing to hand them over for use. Sometimes it is difficult to locate the parents of the frozen embryos and sometimes the couple have divorced and cannot agree as to whether to donate their embryos to science. As we discussed recently it is difficult to establish ownership of the embryos in such cases.

And so scientists are looking for better sources of stem cells.

More on this next week.

Rabbi Gideon Weitzman