

iPS Cells – induced Pluripotent Stem Cells

November 20, 2007 will be a day long remembered as a turning point in stem cell research, in the media's reporting on stem cell research, in the average person's awareness that there are different kinds of stem cell research, and, hopefully, in the decline of the push for government funding of embryonic stem cell research.

On this day, two separate teams of researchers published their papers on their achievement of being able to stimulate ordinary skin cells to become stem cells that are pluripotent – induced Pluripotent Stem (iPS) Cells.

iPS cells are obtained by reprogramming an ordinary somatic (body) cell, such as a skin cell, back to a pluripotent state. The stimulants needed to do this do not have to come from the unborn!

This is HUGE because research, using pluripotent stem cells, does not have to use human embryonic stem cells (hESC), which when taken from the human embryo, destroys the human embryo, the most innocent form of human life. And so, iPS stem cell research is ethically non-controversial, as it does not require the destruction of human life or the use of human cloning.

You may want to take a look at my [Stem Cell Primer](#), a sort of Stem Cell 101 for the layman.

Beverly B. Nuckols, M.D., LifeEthics.org, wrote a concise, easy to understand [summary](#) of the paper published by Wisconsin's Thomson team of researchers. In answer to my question "Does this new procedure use any cells from the unborn to induce the pluripotency in the adult skin cell when creating a stem cell?"

Dr. Nuckols replies:

"Both labs in the news actually showed their final process using adult cells that did not require the death of any human individual at any age.

However, one of the groups (Thomson's, from Wisconsin) proved that the process is possible by using embryonic stem cells and fetal cells from abortions, while the other group (Yamanaka's, from Japan) used mouse cells for the basic science before using adult skin cells.

The most important thing to remember is that the new iPS cells appear to be like embryonic stem cells, but they can be made without killing anyone and they can be made to match the patient."

This is important to know in light of new funding legislation that is likely to be proposed to support iPS research. Legislation must state that no human being at any stage of development will be destroyed.

Gene Tarne, from www.stemcellresearch.org presents [Do No Harm's summary of iPS research](#) and the following:

"The ethical debate (concerning using destructive embryonic stem cell research) centered around this point: our opponents said yes, there are two types of stem cells, adult and embryonic and adult stem cells can do some things, but because they are not pluripotent, their use will be limited, which is why we still need embryonic stem cells, because they are the only ones that are truly pluripotent (although, note that several studies had indeed shown pluripotency in adult stem cells, even before the iPS breakthrough).

Now, along come iPS cells, which are not really adult stem cells, as they are not stem cells isolated and cultured from pre-existing tissue, nor are they embryonic stem cells as they do not come from the destruction of an embryo. Rather, they are truly pluripotent stem cells that can be derived by reprogramming an ordinary body cell, such as a skin cell, back to a pluripotent state, virtually identical to the pluripotent state of an embryonic stem cell.

Now, here is the real importance of this from a scientific and ethical perspective: At the outset of this debate, whether in good faith or just a PR ploy, **our opponents admitted the ethical objections to destroying human embryos for research**, and said this type of embryo-destructive research should take place only if there were no less morally objectionable ways to get pluripotent stem cells. They were, in effect saying the

end justifies the means in the sense that while there was some validity to concerns about destroying living human embryos in research, nonetheless, the benefits of this research outweigh such concerns. But if you can find some other way of doing it that does not present these moral problems, then that is the way we should go. We should then not do embryonic stem cell research if a real, ethically non-controversial method of obtaining the same type of pluripotent stem cells exists. And they promised they would monitor progress on this front. Here is the relevant passage from President Clinton's (n.b. CLINTON, not Bush) National Bioethics Advisory Commission, which first recommended moving forward with federal funding for embryo-destructive research:

'In our judgment, the derivation of stem cells from embryos remaining following infertility treatments is justifiable only if no less morally problematic alternatives are available for advancing the research. But as we have noted, ES cells from embryos appear to be different in scientifically important ways from AS cells and also appear to offer greater promise of therapeutic breakthroughs. The claim that there are alternatives to using stem cells derived from embryos is not, at the present time, supported scientifically. We recognize, however, that this is a matter that must be revisited continually as science advances.'

Well, science has now advanced in a major way, and if our opponents were acting in good faith when they laid down this condition, they no longer have any grounds for continuing to promote embryonic stem cell research, as there is now a morally non-problematic, non-controversial way to obtain pluripotent stems without destroying a living human embryo."

These basic understandings are necessary in order to sift through the deceptions of the media and even researchers who are in favor of embryonic stem cell research and cloning.

A good example of the media using deceptive language to further their pro-hESCR and pro-cloning agenda is Art Caplan, bioethics columnist for MSNBC.com, confusing "embryo" with "embryonic stem cell," and asking if the new iPS cells could be considered a human embryo. Of course [the iPS cell is not an embryo](#).

More commonly the media is misstating the iPS cells to be embryonic stem cells, for example the [National Review Online](#) and the [Houston Chronicle](#). Even Dr. Thomson, leader of the Wisconsin research team, was quoted as saying, "By any means we test them they are the same as embryonic stem cells." The iPS cells are induced to become pluripotent. They are not taken from the unborn!

Be aware that there are many labs, researchers, grants, and companies set up for embryonic stem cell research and cloning. They will put up a fight to stay open and to continue their research. They will repeat over and over again to the media that the study of stem cells requires real human embryonic stem cells.

Beverly B. Nuckols, M.D.:

"I'm afraid that too many labs and too many PhD candidates and sponsors have all their eggs in the cloning basket for the issue to fade decently. Talk about being left behind — all US research centers, such as the [California Institute of Regenerative Medicine](#) — will be negated if they insist on following the dead end trail of cloning and unethical destructive embryonic stem cell research."

However, we can be encouraged by Prof Ian Wilmut's [announcement](#) that he and his lab won't be focusing on cloning or embryonic stem cell research anymore but will instead be concentrating on the new iPS cell research - a good sign that stem cell research is taking a new turn for the better. One of the team members, Thomson, also one of the scientists who in 1998 isolated stem cells from human embryos for the first time, said,

"It's going to completely change the field. These (iPS) cells are more clinically relevant than embryonic stem cells."

We hope that the iPS cells discovery will:

1. Turn scientists away from destructive human embryonic stem cell research and cloning.
2. Make it indefensible for members of Congress to support funding for ESCR and cloning.
3. Advance the research for ADULT SC and iPS cell therapies taking the focus off from ESCR and cloning.
4. Persuade the media to give iPS and ADULT SC research and therapies a more balanced press coverage.