

Hurray For The Proposed Harvard Stem Cell Research Center

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It's not every day that I find an article about someone I know as the front page story of the Boston Globe. I was very pleased this past Sunday to read about Harvard University's initiative to launch a center for the study of human **embryonic stem cells**, and as a follow-on to the main article about fund-raising for the proposed center there was an article about Dr. Ole Isacson of Mclean Hospital in Belmont, MA. Harvard's new center will be comprised of an amalgamation of various existing laboratories throughout the greater Boston area, including Mclean Hospital. Since the federal government currently limits funding of stem cell research to existing (aged) cell lines while prohibiting funding for research conducted from newly generated cell lines, Harvard is skirting the ban by funding its center through privately raised money.

Dr. Isacson, a professor of neuroscience and a director for the center of regeneration at Mclean, focuses on the transplanation of fetal brain tissue into the degenerated area of the brain for those afflicted by Parkinson's disease [[listen](#)]. The brains of Parkinson's patients exhibit a degeneration of the Basal Ganglia (striata or corpus striatum), a dopaminergic center of the brain involved in (extra pyramidal) regulation of fine movement (or motor control). Some degree of this type of degeneration occurs "normally" in the aging process and can be noticed by the slight shaking of the hand of an elderly person for example, but this condition is exacerbated in Parkinson's patients to the point of spasms and the complete inability to walk or sit still. A type of cell therapy to treat Parkinsons harvests young cells from that part of fetal mamalian brain that would normally develop into the Basal Ganglia (corpus striatum), and transplant it into the equivalent area of the host brain in the patient. The transplanted cells would recognize the cellular signals given off by neighboring areas of the brain, which would cue the cells to develop normally and replace those that have died in that brain area. Those cells have been shown to take hold in the patient's brain, develop properly, and begin producing dopamine, hopefully in the desired levels to restore the neural networks that govern fine control of movement. The result is the amelioriation of Parkinson's symptoms indefinitely. Some day this type of therapy may be replaced by the use of neural tissues grown from embryonic stem cells instead.

It has been a few years since I have given this area of research any thought, now that I work in the software industry. But this was once my area of focus, and I had hoped that my thesis would have been in this field back when I was in the Neuroscience Ph.D. Program at **UCHSC** in Denver. It was there in 1997 that I met Dr. Isacson at a backyard barbecue given by Anne Charlotte Granholm, the professor whose lab I was rotating through that summer.

I credit Dr. James Joseph with having provided the guidance and motivation to my interests in Neuroscience. I first met Jim while at the National Institute of Aging, a part of the National Institutes of Health. Jim was part of the Laboratory of Cellular and Molecular Biology (**L-CMB**) there, and he invited me to be his lab assistant working on age-related declines of G-Protein Coupled Receptor activity in striata (GTPase activity specifically). Jim later moved to Boston to head the department of **Neuroscience** at the USDA Human Nutrition Research Center on Aging at Tufts University. At Jim's request I also moved to Boston to continue in his lab, and thus was my emmigration from Baltimore to Boston 10 years ago this May.

By the way, every time you hear Larry King mention the antioxidant benefits of grape juice or blueberries in radio commercials for Welch's or Ocean Spray, it was my USDA lab that initiated those studies [[full paper](#)]. Dr. Gouhua Cao and his student Hong Wang did initial work on oxygen radical absorbance by phytochemicals [[paper](#)].

After having left the Ph.D program in Denver, I began work for Biotransplant of Charlestown, MA [See [PBS Frontline's documentary on Biotransplant](#)]. That company researched xenotransplantation, the transplantation of tissues between species. You see therapies such as what Ole Isacson studies are highly controversial as you can imagine, and the best hope to escape the controversy was to develop techniques to prevent the rejection of tissues transplanted from fetal pig to human adults. This type of rejection is hyperacute, much worse than that of human to human. I later interviewed several times with Biotransplant's sister company, [Diacrin](#), located just across the street from each other.

Diacrin, at that time, was developing ways to harvest the ventral mesencephalon of fetal pig, treat it with antibody-fragments in such a way as to reduce or eliminate the hyperacute rejection, and finally implant a few hundred microliters of the cell solution directly into holes bored into the foreheads of conscious Parkinson's patients during outpatient sessions, while in the clinical trials of FDA testing back in the mid-late 90's. It would have been my job to do the harvesting in conjunction with the animal colonies at Genzyme in Framingham, and then later prepare the fetal brain cell cocktail back in the lab while under sterile conditions.

But alas, I was not hired by Diacrin and went on to Brandeis University [Department of Neuroscience](#) instead, where I cultured neurons from the visual cortex harvested from early post-natal rats. While I enjoyed the technical aspects of cell culture, especially watching neural cultures grow and flourish, I never did latch on to the visual cortex as an area of interest. These cell cultures were used by Gina Turrigiano's students while studying the regulation of NMDA and AMPA receptors. We even grew neuronal cultures on tiny dishes over microelectrode arrays (MEAs) so that computers could monitor precise electrical activity of the whole network on a per cell basis to better understand mechanisms of Hebbian Learning (neurons that fire together, wire together) [[Wired article](#)]. Gina later went on to win a [MacAuthur grant](#) of \$500k that next year.

At Brandeis I wore several hats including the management of the lab's 25+ Macintosh computers and the authorship of the lab's first website [See also the lab website for [John Lisman's](#) lab, which has since been trampled by unskilled editors]. Thus was born my interminable dislike for the Macintosh, which burns inside me to this day. I suppose I should get over the horror of earlier Macs, and learn to appreciate the elegance and stability of Mac OSX, a Unix variant. But from this experience was born my zeal for web technologies, which has in turn brought this blog to you.

At any rate, back to Harvard's new center for human embryonic stem cell research, it is this very type of research on cultured cells derived from one week old embryonic tissue that holds the best promise for reducing or eliminating the need to harvest brain tissue derived from aborted fetuses. I don't know if current research still employs the use of aborted fetuses or not, but I do know that at one time this practice was performed legally, if surreptitiously, and unfortunately remains an icon for those that

vilify this type of research.

Human stem cell research is going on throughout the remainder of the modern world, and the current federal policy to prohibit funding of this research in the United States is a policy which I believe has its days numbered. On this eve of John Kerry's big win across the US ("Bring it on !!"), I expect that tide of federal policy will likely turn to wash out the anachronistic funding constraints that currently plague the US and that impede the development of modern medicine and science. But more importantly, I hope that Harvard's fund-raising effort for this new research center will someday be matched and embraced by federal government, facilitating a cure for diseases like Parkinson's once and for all.

Related Resources:

- Museum of Science: [Stem Cells Hold Hope for Future Cures](#) (including Parkinson's)
- Harvard Gazette: [Melton Derives New Stem Cell Lines](#)
- Museum of Science: [Stem Cell Research](#)
- Boston Globe Archives: [Search Achives for Articles on Stem Cell Research and Harvard](#)
- CNN: [Harvard Plans Stem Cell Research Center](#)
- Neurology Review: [Parkinson's Researchers Aim High](#)
- NPR Talk of the Nation: [An interview with Ole Isacson](#) [audio]