Contested cultures: views from the beta cell lab on controversial science and ES cell therapies for diabetes

**Introduction**

This poster draws on our social research on the problems and prospects of stem cell biology in the field of diabetes, liver disease and neuroscience (Williams et al, 2003; Wainwright, 2005; Kitzinger & Williams, 2005; Wainwright et al, 2006a, 2006b). Recent advances in the transplantation of human islets into patients with Type-1 diabetes have stimulated research on making beta cells. We report on how seven biomedical scientists from one UK lab, who work on turning ES cells into insulin producing beta/insulin cells, view the scientific literature and their research in this field.

We highlight the impact of two seminal papers, published in prestigious journals, Science and Science. We draw on Harry Collins' notions of the experimenters' regress in science. Using our social research, we illustrate the salience of the core set, the problems and the difficulties of laboratory science in generating and resolving scientific controversies within their field.

**A revolution in beta cell biology?**

Lumelsky et al (2001) showed that cells of the endocrine pancreas could be generated from ES cells in vitro (Figures 2 & 3). The Lumelsky paper… was a little bit of a misguided paper because it wasn’t well reproduced, but it was probably good in terms of impetus, it got a lot of people doing this. (Scientist 4)

Figure 1. Contested science: the experimenters’ regress (Collins)

However, the Melton lab (Rajagopal et al, 2003) demonstrated that rather than the cells producing insulin (Figure 4), insulin was absorbed from the culture medium and then secreted by cells (Figure 5).

Figure 2. Pancreas could be generated from ES cells in vitro

Figure 3. Lumelsky protocol, A; RT-PCR of pancreatic gene expression, B

Figure 4. Immunostained ‘islet clusters’ (insulin, glucagon, somatostatin), Lumelsky

Figure 5. The Melton critique (Rajagopal et al, 2003)

We know that the initial Lumelsky paper that sparked this all off was based on an error. The cells weren’t making insulin, they were taking it out of the culture medium. We knew that before that was published, because we couldn’t find any significant gene expression… So it was clear there was something wrong with the protocol… Melton had the brains to publish it in Science. That knocked off the first paper [Lumelsky et al, 2001] and undermined a whole series of papers in press… The results tend to be: ‘We have reproduced this. A small number of cells differentiate to an insulin genotype’. But it’s not clear what the phenotype of the cells is, in our opinion. We think that the cells are doing it themselves rather than responding to any external stimulus. (Scientist 3)

**Turning stem cells into beta cells?**

The oral culture of the lab contests published results on making beta cells from ES cells.

I don’t want to be a Cassandra and say it’s never going to happen… The science of stem cells is very difficult… We know very little, and that’s why we are having trouble directing them. (Scientist 1)

This lack of knowledge consists of several problems: cell culture, in vitro developmental biology, and understanding experimental processes etc. For example, the lack of appropriative biological markers to track the transformation of HES cells into beta cells.

**Conclusion**

Stem cell research is ‘science-in-the-making’ rather than established ‘ready-made-science’, hence turning ES cells into beta cells is contested. Is this a field of science that scientists should invest their time, resources, and staff in? (Figure 6) The difficulties of laboratory science illustrate the salience of the core set and the experimenters’ regress for social research on the cultures of science.

**Acknowledgements**

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**References**


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