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Human embryos as boundary objects? Exploring the interactions between the social worlds of pre-implantation genetic diagnosis and embryonic stem cells

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Introduction

In the worlds of both Pre-Implantation Genetic Diagnosis (PGD) and of human Embryonic Stem Cells (hESC) scientists inevitably work with human embryos. This poster draws on our social research on ethical aspects of PGD (Ehrich et al, in press; Williams et al in press) and hESC research (Williams et al, 2003; Kitzinger & Williams, 2005; Wainwright et al, 2006a, 2006b). Our objectives are to:

- examine the notion of boundary-objects as an approach for understanding the social construction of embryos.
- analyse the ways in which embryos and human cells have similar and different meanings in the two related worlds of hESC and PGD.
- explore the increasing alignment between these worlds being brought about by the shift to the production of hES cell lines from PGD.

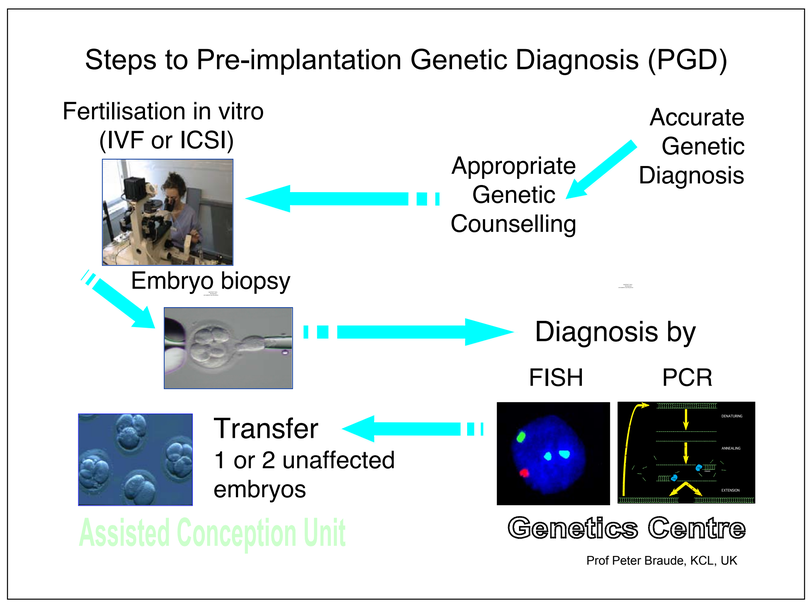
Embryos as boundary-objects

The term 'boundary object' describes the shared understandings and collective actions in related but different social worlds. Embryos act as boundary objects that help differentiate the worlds of PGD and hESC, but they also allow various translations between these two worlds.

The goals of PGD and ESC

How do the divergent goals of PGD and hESC structure the different meaning of embryos in these social worlds?

Figure 1: the process of PGD



The primary goal of PGD is maximising making 'healthy' babies

> *At the end of the day, what we're after is healthy babies in cots. [PGD Scientist 8]*

The secondary goal of PGD is minimising creation of spare/waste embryos:

> *There's a balance of priorities between minimising the risk of misdiagnosis and maximising your chance of a live birth... We're very keen on single cell biopsy, whereas other groups will do two cell biopsy because that minimises your risk of misdiagnosis, but we think it's at a cost as you will have fewer births at the end of the process. [PGD Scientist 3].*

The tertiary goal of PGD is supplying embryos for therapeutic research:

> *The affected ones are sort of dismissed in my line as being affected… If they can use these embryos, then that's better for me than chucking them in the bin. [PGD Scientist 8]*

The primary goal of hESC is using spare/waste embryos for therapeutic research:

> *I am a scientist who has a burning desire to do something useful. We are taking material that's going to be destroyed and we are trying to create therapies out of that. [ESC Scientist 8]*

Linking the worlds of ESC and PGD

Boundary objects emerge when elements of the work of groups coincides:

> *Developing hESC for us has just been a way of getting cells that might have some potential… We don't use any routine IVF material whatsoever, all the best embryos are going to the patients. All we are using is what's left over exclusively from PGD… [We] made a decision that from an ethical standpoint the PGD embryos represent an ethically un-contentious pool of embryos because you would never implant those. [ESC Scientist 8]*

Different disciplines allow differing perspectives to be focused on the objects of research, so embryos mean quite different things to scientists attempting to derive hESC lines:

> [ESC Scientist 8] *was more interested in hESC as a stem cell, what happens to them, how they change and so on. But* [PGD/ESC Scientist 8] *and I were more interested in the embryo, in what kind of embryos made good stem cell lines. I was quite interested to try and get PGD lines which could be very important stem cells for therapy… This is a potential source to study genetic conditions. You could actually look through the very early stages where the genes switch on. What actually happens? Can you change it? Could it be a pharmaceutical target? [PGD/ESC Scientist/Clinician, 16]*

Figure 2: from PGD as a reproductive technology to PGD as a source of hESC

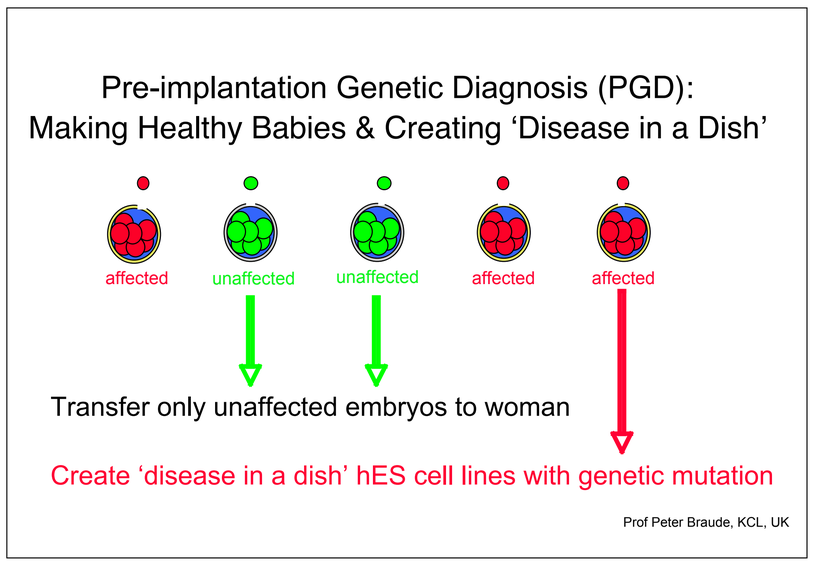
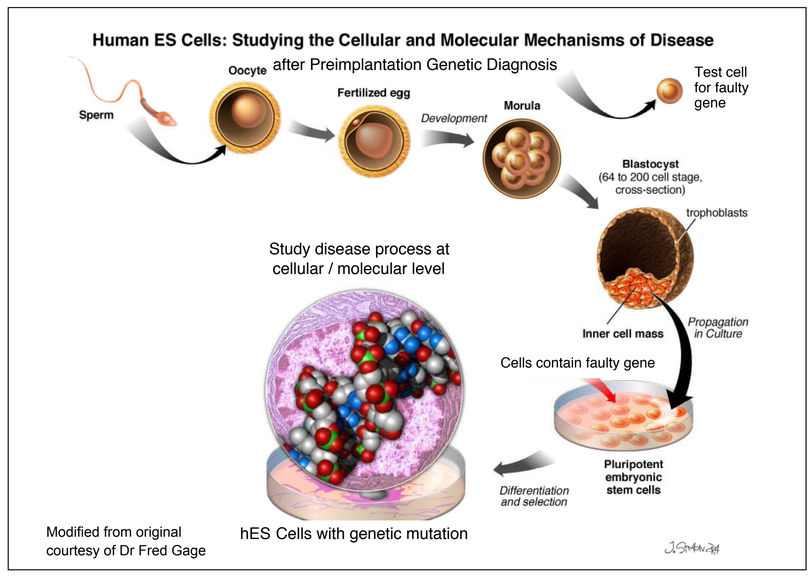


Figure 3: linking PGD and stem cells – creating disease in a dish hESC lines



Embryos function as boundary objects that enable scientists to pursue similar yet different goals as they shape practices in the interrelated worlds of PGD and hESC research. One example of a hESC line created from an affected PGD embryo contains a key Cystic Fibrosis gene (Pickering et al, 2005).

Conclusion

Boundary objects act like anchors which help moor participants within different social worlds, whilst 'translational boundary objects' act as bridges which allow the growth of scientific trade between different and yet similar social worlds. This makes possible new kinds of enterprises. The development of the embryo as a boundary object 'enabled' hESC research, whereby what were once affected 'spare' PGD embryos became valuable 'disease in a dish' hESC lines.

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