

Blood money for what?

Professor Naomi Pfeffer explains why the unregulated private blood banks threaten to exploit pregnant women

Is 'banking' your baby's umbilical cord-blood really a wise decision? Private cord-blood bankers want expectant mothers to believe it is. The UK Cord Blood Bank calls it 'a lifesaving choice'; the company Smart Cells claims it offers families extra peace of mind.

But experts warn it is a complete waste of money; new parents can certainly find better ways of spending a thousand pounds. The picture these companies paint is, at best, a rose-coloured one and, at worst, misleading. Their promotional material exaggerates the likelihood of a child succumbing to a life-threatening disease, twists complex unanswered scientific questions into established 'facts' and presents false claims as to therapeutic efficacy.

Where did it all start?

Until recently, placentas have been thrown away without a second thought. But because they hold between three- and five-fluid ounces of cord blood, which is rich in stem cells, placentas have now been transformed from a waste product into a potentially valuable resource.

No one knows the true worth of stem cells: many of the claims made about them are highly speculative. Stem cells are central to normal human growth and development, and have two unique properties: the capacity to renew themselves; and the potential to differentiate into one of the 200 or so different types of cells in the body, such as hair, nerves and blood. Other cells are unable to replenish themselves and are renewed from other sources; they are also differentiated—that is, committed to becoming a particular type of tissue.

Stem cells are found in embryos, fetuses, placental (umbilical cord) blood and bone marrow. The stem cells found in early embryos are 'totipotent' (unspecialised), and have the capacity to become any other type of cell.

This plasticity diminishes as the embryo develops. Indeed, the stem cells in placental blood are 'multipotent'—that is, their potential to become other types of tissue is more restricted than it was in the early embryo.

The plasticity of adult stem cells is even more limited but, in time, scientists may be able to de-differentiate them by 'turning back the clock' and making them behave like un-specialised cells again.

Totipotent stem cells are considered the most valuable, but they are also the most controversial as they are found in so-called 'spare' or 'leftover' embryos created in the laboratory as part of in-vitro fertilisation (IVF) treatment. Opponents of embryonic stem-cell research also object to the collection of stem cells from aborted fetuses. Some tricky questions

concerning consent and ownership are raised with the collection of umbilical cord blood that is not the mother's, but the baby's.

Stem cell research in the US

Actor Christopher Reeve, who played Superman in the 1978 movie, backed a campaign before his untimely death to overturn US President George W. Bush's refusal to allow federal or publicly funded research to use human embryonic stem cells. The publicity surrounding the campaign conveyed the impression that all stem cell research is outlawed in the US but, in fact, it can and does proceed with funding from other, private sources. However, where research is driven by the profit motive, valuable findings are immediately made commercial and, often, any resultant product may become too expensive for most people to benefit from.

In contrast, research using stem cells from every or any source is permitted in the UK, although embryonic stem-cell researchers must obtain a licence from the Human Fertilisation and Embryology Authority (HFEA), which is backed by the Medical Research Council (MRC) to the tune of £4.5 million of taxpayers' money annually. Any findings from their investment will, it is hoped, be freely available on the NHS.

Christopher Reeve hoped that stem cell research would find a way to repair spinal injuries like the one he suffered when he fell from his horse. Other people are praying that it will produce treatments for the common degenerative diseases that are currently incurable, including Parkinson's and Alzheimer's, and also identify ways of encouraging stem cells to develop into cells that could be used in the regeneration of other diseased and damaged tissues. One day, for example, it may be possible to make a relatively small number of stem cells grow into a very large number of pancreatic cells that can produce insulin and cure diabetes.

Transplantation

It is difficult to distinguish hype from reality in stem-cell research. For more than two decades, stem cells have been used successfully to treat some life-threatening diseases of the blood, in particular, leukaemia. In this case, the treatment involves transplanting bone marrow collected from a volunteer donor, whose tissue type matches as closely as possible that of the recipient. A family member is usually suitable; otherwise, doctors consult a donor registry to find an unrelated match. The Anthony Nolan Trust, a charity formed in 1974, holds the UK's largest stem-cell register and helps people anywhere in the world to find a donor.

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