the social science stem cell initiative

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

Haematopoietic Stem Cells
The Dynamics Of Expectations In Innovation

1. Summary and research aims

The project is focused on haematopoietic stem cells (HSCs) for the treatment of cancer and other conditions. HSCs reside in the bone marrow and are the immortal progenitors of many tissues in the blood and immune system. Unlike all other stem cell therapies, only a few of which have even been experimentally tested, HSCs have been routinely used as an alternative to bone marrow transplantation since the late 1990s. Novel applications of HSCs are currently being developed for the treatment of other conditions, such as stroke. Their adoption may therefore represent a paradigm for emerging stem cell technologies.

Main research question: *how has haematopoietic stem cell technology been developed as a therapy, to what extent has it been commercially exploited, and what are the prospects for its future development?*

2. Initial research findings

<u>The dynamics of expectations in stem cell innovation</u>

A major focus of the project is on the changing expectations and contested identity of HSCs. While much social science critique has of late been focused on embryonic stem cells, relatively little attention has been given to the historical emergence of stem cell biology, especially the importance of blood innovation stretching back through the middle of the twentieth century and beyond. In particular, the origins of stem cell technology lies in post-war radiobiology and the early development of bone marrow transplantation. Present-day stem cell networks inherit much from the historical engagement of medical technology with blood, especially in the contexts of blood processing, bone marrow transplantation and, more recently, gene therapy. In making sense of the shaping of blood stem cells our research draws on perspectives in the 'sociology of expectations' in exploring the way current expectations of stem cells are historically constituted. In this way we examine the way biological entitiesHSCs in this casebecome the focus and bearers of future value in contemporary global stem cell economies.

<u>The commercial development of stem cell technology</u>

The project has explored the commercial development of stem cell technology from the 1990s to the present day. In the mid-1990s enthusiasm for the potential of the technology to treat cancer stimulated the creation of a now largely forgotten first 'wave' of industrial interest and investment and the formation of ~15 US firms dedicated to the commercialisation of HSCs. At the height of this activity in 1996/97 several leading cell-processing firms were acquired by large pharmaceutical companies for hundreds of millions of dollars. However, by the end of the decade nearly all these enterprises had ceased trading. This was followed by a period of disappointment and disinvestments. Despite this setback, the last few years have seen major scientific advances, which have created new hopes of using HSCs in 'regenerative medicine'. Internationally, there are now over 100 firms focused on stem cell therapies, many of which are working on HSCs. This re-emergence of the stem cell industry is marked by major differences from the first wave of industrialisation, including the types of clinical applications, the business models adopted, and the design of the technology itself. However, the sector suffers from a number of significant weaknesses, including a lack of products on the market, limited investment, and little collaboration with large companies. From this analysis it appears that the commercial prospects for stem cell technologies remain highly uncertain. As a consequence, innovative public policies need to be adopted to prevent 'market failure'.

Paul Martin, Alison Kraft, University of Nottingham
Philip Bath, Division of Stroke Medicine, University of Nottingham
Nik Brown, University ofYork

Co-ordinator: Prof Andrew Webster Administrator: Stephanie Hazel-Gant
Department of Sociology, University of York, Heslington, York, YO10 5DD Tel: 01904 43 4740 / 3064
Email: ajw25@york.ac.uk / sjg11@york.ac.uk