

THE LIVER GROUP
CHAIRMAN'S REPORT
FOR THE YEAR ENDING 31 DECEMBER 2010

2010 was a year of significant progress in our aim to create an effective device to save the lives of patients with severe liver disease with a bio-artificial liver that can temporarily take over deficient liver function, and thus allow time for a patient's own liver to recover.

Completion of this project needs various strands of work to be woven together. The first – which has for many years been the major component of the work, is the creation of an adequate functioning cell mass; the second is the engineering – with appropriate safety features – the machine, or bioreactor, in which the cells grow and which is then connected to a patient's blood circulation; and the third is the demonstration that benefit is conferred by its use in liver failure. I am pleased that there have been substantial advances in all these areas.

The process for growing the cell mass has been progressively developed so that now the liver cells we can place in the bio-reactor equate to approximately 30% of the factory-cells of the liver; this work, with collaboration with biochemical engineers elsewhere in UCL, has involved designing and testing optimal protocols for nourishing and oxygenating the cells as they grow. We have established collaborations with the University of Miskolc in Hungary to purify the alginate, the jelly-like beads - in which the cells are nourished. One of our PhD students has tested the filter systems that will be needed to prevent the transfer of any unwanted material from damaged cells in the bio-reactor into the patient. And perhaps most impressively, the very complex logistical and practical exercise of our large animal trial, performed in the University of Cape Town in collaboration with the Dept of Surgery, in the Christian Barnard centre and Department of Medicine in Groote Schuur, neared completion (achieved by March 2011). Most encouragingly there was substantial evidence of the efficacy of our system.

There are two 'next moves'. The first must be to gain the major tranche of funding that will be required to specify and manufacture the bioreactor to the stringent quality control and regulatory standards that will be required before a 'first-in-man' experiment can be tried. For that 2010 has seen a major application to the Wellcome Trust – and result of that is pending. There could be better financial climates for seeking major Charity and government funding!

The second 'next move' is a further scientific challenge – to adapt our bioreactor system so that the bioreactor with cells within it can be cryo-preserved – deep frozen - so that the bio-artificial liver can be readily transported and thawed as and when needed. We have begun work on that, moving from simple approaches which can be used when there are only a few cells in a small volume of fluid, to the more complex processes that need to be developed for the large numbers of cells in alginate beads that our bioreactors contain.

So 2011 presents us again with challenges, both scientific and in fund-raising. I and all the trustees wish to express our immense gratitude to our supporters, without whom our work would not be possible; to our colleagues in the laboratory at UCL who have worked so hard to progress the project; and to our auditors. I must add my personal thanks to my fellow trustees for all their dedication and help.



Humphrey Hodgson
Chairman